THE IRON TRADE REVIEW

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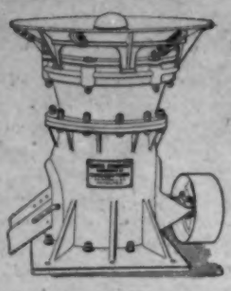

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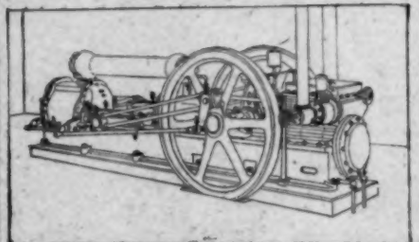

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THE IRON TRADE REVIEW

VOLUME XXX. CLEVELAND, O. MARCH 11, 1897 CHICAGO, ILL. NUMBER 10.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

A weaker market for Bessemer pig, with a falling off of 15 cents, valley and Pittsburg, is the chief feature of the week. At valley furnace $9.90 to $10 is the basis named in connection with pending negotiations, but sales are rare, the only important transaction being a three-cornered coke and iron deal, involving a Pittsburg firm handling by-product coke, and a furnace and steel works in Northern Ohio. The wait seems to be on the Bessemer ore producers, the postponement of whose meeting for another week argues still more strongly for agreement. Judging from the course of the market in the early months of 1896, however, the price of ore has no great bearing on that of Bessemer pig iron. Furnacemen insisted last year that with the higher price for coke and the advance to a $4 basis for Gogebic Bessemer ores, more money must be had for iron. Yet the $4 price for ore never figured in the price of Bessemer iron the whole year through. In the first half of the year the cheap ores carried over from 1895 depressed the market and in the second half the utter demoralization of all business, and with it the general anticipation that 1897 ores would go much below the figure for 1896. Demand, rather than existing or prospective cost of materials, decided the price, and that is the situation to-day. The stronger feeling in billets, apparent in the past two weeks, continues in spite of the decline in Bessemer. With the large current production of rails and the heavy engagements of steel mills generally, on steel sold at the first of the year, new business in billets encounters advancing quotations, and the market promises to be steady and strong. Wire and wire nails grow in strength, and $1.30 and $1.40 respectively represent the Cleveland market. Eastern reports show sales of billets at $18, Philadelphia, and further business in plates and shapes, but bars and sheets are sluggish and unpromising. Car-buying is far from pronounced, but railroad and track supplies are increasingly active. In the East architectural wants are being canvassed, with a fair prospect for the structural mills, and in the West viaduct and bridge work is the chief factor in current structural demand. The great foundry interest is hedged up with persistently small demand, on the one hand, and on the other with discouraging prices on whatever there is to do. Some time must elapse before it can count largely as a buying factor. Concessions continue to be made from recent Southern quotations, but with the leading Birmingham interest $7 at furnace for No. 2 foundry and No. 1 soft and $6.25 for gray forge are minimum quotations. Virginia producers have taken some Eastern business by shading prices adhered to for some weeks. There are further rail sales, week by week, and $21, Pittsburg and Chicago, is the open quotation. The recent order of the Canadian Pacific was for 65,000 tons, instead of 60,000, and all went to Pittsburg.

THE CLEVELAND DISTRICT.

The postponement of the final meeting of Bessemer ore producers until next Tuesday is taken to indicate progress in the negotiations between the Lake Superior Consolidated Iron Mines and the Minnesota Iron Co. The latter's Vermilion range product would be included in an old-range agreement, in any event, but the question now up relates entirely to the Mesabi and is more one of tonnage than of price, though price is an element, too. It was the high price put on it by the pool agreement that practically shut one Mesabi mine out of the market last year. Some concession in output to mines reached by the Duluth & Iron Range is expected to be made, that will harmonize the two interests before the meeting of next week. The question of a reduction in freights from mines to docks, by railroads hauling ore from the three oldest ranges, is having serious consideration. Something is likely to be done in this direction, but the extent of the reduction is not determined. With a view to giving a larger market for certain non-Bessemers of the Menominee range, through the displacement of Southern irons in districts tributary to Pittsburg, Wheeling and Ohio furnaces, there is some agitation for the putting of mines in the Cyrstal Falls and Iron River districts on the same freight basis as those at Iron Mountain. At present the differential is 5 cents. The railroads appear to appreciate the situation brought about by Mesabi developments and some action is probable.

Pig Iron Little has been sold in Cleveland and tributary districts in the past fortnight. Two Cleveland furnaces recently made sales of Bessemer to an Ohio steel works, but deliveries do not begin until May. The total is said to be 30,000 tons, and a coke deal with a buying and selling interest at Pittsburg is one feature of the transaction. Bessemer has been weak since last report, and middlemen's offers were $9.90 and $10 for prompt iron. There is a little better feeling to-day and $10.10, valley, is a minimum with the furnaces. Very little has been done. Foundry iron is very quiet; business sharply competed for has brought out quotations of $9.40 to $9.65 valley for No. 2. Gray forge is weak at $8.75 to $8.85, valley. A conflict between the Central Traffic and the Joint Traffic associations over reduced rates from Pittsburg and valley points on pig iron, billets, skelp and slabs has led to the postponement of the reduction proposed by the Central Traffic Association, to go into effect March 15. We quote Cleveland prices, the valley freight being 65 cents:

Bessemer	$10 75	Valley Scotch No. 1	$10 90@11 15
No. 1 Strong Foundry	10 90@11 15	Valley Scotch No. 2	10 60@10 75
No. 2 Strong Foundry	10 15@10 40	Gray Forge	9 50@9 65
No. 3 Foundry	9 90	Lake Superior Charcoal	13 50

Finished Material. There is no change in prices in finished lines, save that wire nails have advanced to $1.40, car load lots. Iron mills in the valley report a falling off from the spurt of two weeks ago. Bar iron is practically meeting steel prices at points remote from Pittsburg; 1.05c, valley mill, is the usual quotation. The Cleveland basis on steel bars is 1.10c. Some Wheeling & Lake Erie bridge work at Toledo and along the line amounts to several hundred tons. On plates, 1.20c. Cleveland is the ruling quotation, and 1.65c continues the pool basis on beams. The feeling among mills continues hopeful, but prices and volume are still quite unsatisfactory.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
1142 MONADNOCK BLOCK, March 10

The first week of the new administration did not show any marked change for the better, but there appears to be a steady improvement all the time. In most cases orders are limited to what would ordinarily be called small lots, but they are becoming more frequent, and possibly a little larger. There is a very large inquiry for material of all kinds in the market, but for one reason or another actual orders for these inquiries continue to be delayed from week to week. It is thought, however, that a decided improvement in conditions will be had within a few weeks, resulting in the placing of a good many of these delayed orders. Rumors are heard of further large sales of rails, but these could not be definitely located. There is a decided improvement in the demand for steel for bridge work from the railroads, and at least two good sized contracts have been placed in the last week. Other contracts, including both large and small ones, will come up in the near future. Building operations have been light in this city and there are no indications that they will improve right away.

PIG IRON.—There is a considerable inquiry in the market for iron, the buying of which is contingent upon foundries securing orders for their products. How much of this will result in actual business can only be conjectured, but a fair share of it is likely to be placed within the next month or six weeks. The present needs of consumers generally are light, and as a rule buyers are not ordering material for more than their actual requirements. There is a steady improvement, however, in the number of orders for small lots. Some buyers appear to be of the opinion that prices are being held too high by the furnaces. On the other hand, furnacemen argue that when the large sales of steel are taken into consideration, it must be clear that the number of furnaces running on foundry iron will be decreased rather than increased, and that the moment a decided improvement in the demand for foundry irons is experienced, producers will find their capacity almost if not quite fully occupied. One sale of 2,000 tons of Southern iron was made the first of this week. This is the largest sale of Southern iron which has been made in this market for three months, if not longer. The price was quite a little under the open quotation. Prices of Southern iron are weaker, and are revised below:

Lake Sup. Charcoal	$13 50@14 00	Southern No. 1 Soft	$10 90@11 25
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 2 Soft	10 15@10 25
Local Coke Fdy. No. 2	11 00@11 50	South'n Silveries	11 40@11 65
Local Coke Fdy. No. 3	10 75@11 00	Jackson Co. Silveries	14 00@16 00
Local Scotch Fdy. No. 1	11 50@12 00	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Silveries No 2	14 50@15 00
Local Scotch Fdy. No. 3	10 75@11 00	Ohio Strong Softeners	14 00@14 25
South'n Coke No. 1	11 00@11 25	Alabama Car Wheel	16 00@16 50
South'n Coke No. 2	10 40@10 65	Malleable Bessemer	12 00@12 25
South'n Coke No. 3	10 00@10 15	Coke Bessemer	13 00@13 50

BAR IRON.—There is quite a little figuring on inquiries that are in the market and some of these will undoubtedly develop into orders in a short time. Sales last week were hardly so large as those of the week before, but were still very fair. Quotations are lower on common iron and are made at 1.15c to 1.25c. Billet-stock steel bars are quoted at 1.15c to 1.25c, although several of the mills refuse to sell at the bottom figure.

RAILS AND TRACK SUPPLIES.—Reports are heard of further large sales of rails, but it is impossible to verify them. Some business was undoubtedly taken, and probably at figures under the open quotation. There continues to be a good demand for light sections, and fair sales were made last week. Quotations are made as follows: Rails, $21 to $23, according to specifications; steel splice bars, 1.20c to 1.30c; track bolts with square nuts, 1.95c to 2c; hexagon nuts, 2.05c to 2.10c; spikes, 1.65c to 1.75c.

BILLETS AND RODS.—A small business was done in billets last week and there is only a moderate demand. One or two inquiries of large size for rods are in the market, but the mills are apparently not very anxious for further business except at higher prices. Quotations are made at $17.50 to $18 for billets and $22.50 to $23 for rods.

STRUCTURAL MATERIAL.—The Chicago, Milwaukee & St. Paul Railroad placed contracts last week for a heavy tonnage of bridge material which will be made in Pittsburg, and the Union Pacific gave out a contract for over 1,500 tons which will come from an Eastern mill. Other contracts for bridge material, some of them of quite good size, are under consideration and will probably be placed soon. General business is improving and orders are more frequent all the time. Quotations are as follows: Beams and channels, 1.75c to 1.80c; angles, 1.25c to 1.30c; plates, 1.25c to 1.30c; tees, 1.50c to 1.55c. Small lots from stock are quoted ¼c to ½c higher.

PLATES.—Some mills report a very light demand and small sales, while others say that there is a steady improvement in business, and that the inquiry is growing larger all the time. No especially noteworthy contracts were placed last week, but the business closed included several good sized lots. Prices are made as follows: Tank steel, 1.25c to 1.30c; flange steel, 1.35c to 1.45c; fire-box, 2c to 5c.

SHEETS.—Last week was a trifle better than the week before, sales having been larger and more numerous. Quotations are made at 2.15c to 2.20c for No. 27 black and 80 to 80 and 5 per cent discount for galvanized.

MERCHANT STEEL.—While no large contracts have been placed, general buying continues to improve and the tonnage closed last week was quite satisfactory. Prices are as follows: Open-hearth spring, tire and machinery steel, 1.85c to 1.95c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.55c to 1.65c; tool steel, 5.50c to 7.50c; specials, 11c and upwards.

OLD MATERIAL.—No sales of any importance were closed last week, nor is there any improvement in the demand. The market is quiet and it seems likely to remain so for some time. Prices are made at $12 and $12.50 for old iron rails, $8.50 to $9 for old steel rails, and $10 to $10.50 for old wheels. Miscellaneous scrap is quoted about as follows: Railroad forge, $11.50. to $12; dealer's forge, $10 to $10.50; No. 1 mill, $7 to $7.50; heavy cast, net ton, $7.50 to $7.75; malleable cast, net ton, $8.50; axles, $13; cast borings, $3; wrought turnings, $4; axle turnings, $5.50 to $6; mixed steel, heavy, $7.50; stove plates, $5.50; heavy melting steel, $9.00 to $9.25.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
807 TRADESMEN'S BUILDING, March 10.

Reactionary tendencies have materially weakened pig iron since the last report, and the general tone of the market, owing to this fact, is not so firm. No trace of the decline, however, is seen in billets, the change, if there be any, being in the direction of still higher prices. Sheared plates and structural shapes show the more favorable developments of the week, improvement being marked in both lines. In the former there are traces of new business. Rails at $21, Pittsburg, are still marketable and the local interest continues to take business. Opinion is general that the Duquesne plant will soon be put on rails. It is reported that the leading local interest, believed to be under contract to supply billets to an Allentown mill, has transferred the 10,000 tons of steel required by the latter plant to Scranton. The Duquesne mill is at present running to its full capacity on billets, over 8,000 tons being made last week, all of which were stocked for future use.

PIG IRON—Bessemer pig has gradually receded from the advance maintained for two weeks and $10 is again the basis for prompt iron in the valley, with Pittsburg iron slightly weaker at $10.50. The trading of the week has been slight and the continued scarcity of business is the most powerful factor in the present decline. Offers of iron at $10.10 by valley furnaces have found no consideration, and iron held at $10.65, Pittsburg, is in no demand. To what extent the higher prices asked of late have ruled, is not easily seen, but the opinion is not lacking that the advance has been largely one of sentiment and of little force in governing current transactions. Foundry irons seem to share in the decline and a sale of 200 tons of No. 2 at $10 is reported. In smaller lots $10.25 and $10.50 are being made. Gray forge has been fairly active, two lots of 1,000 tons each being reported sold at $9.50. We quote, f.o.b. Pittsburg, as follows:

Bessemer	$10.50 to $10.65
No. 1 Foundry	11.00 to 11.25
No. 2 Foundry	10.25 to 10.50
No. 3 Foundry	10.00
Gray Forge	9.50

BILLETS.—The steady demand for billets continues, and is reflected in the firm tone maintained by Pittsburg mills, which are

taking only attractive business. Finishing mills are buying billets, and a wider range of interests is included in the list of consumers. The week has seen no weakening in the quotations, ruling since the flurry in rails. The tendency is rather toward higher prices and the business now taken is largely based on prices above $15.50. By one mill $15.70 is held as minimum, while others make no open quotations. Steel in middle hands rules but slightly under these figures. A decided stiffening in sheet bars is reported, with prices quoted as high as $18. This can doubtless be materially shaded. Rods at $21.50 and $22 are active and firm.

RAILS AND TRACK SUPPLIES.—Rails continue to be booked by the Pittsburg mill at higher prices than those ruling so far. The quotations of $21, Pittsburg, is held. No official statement has been given regarding the Duquesne plant, but its change to rails is anticipated. Track supplies are active. We quote: Rails, $21; splice bars, 1.40c to 1.45c; track bolts, iron, 1.95c to 2c; steel spikes, 1.65c to 1.75c.

STRUCTURAL MATERIAL.—A change for the better is seen in structural material. The work closed in the week includes material for the Seneca Street viaduct at Buffalo—about 2,300 tons—and smaller requirements of bridge shapes. New work being figured on by local mills includes 2,500 tons of bridge material for the Great Northern Railway, a viaduct at Kansas City, and several Eastern buildings. New specifications are coming in and the outlook is much improved. Beams continue firm at pool rates and no evasion is reported. On a good order of angles or universal plates the appended quotation of 1.10c could probably be shaded. We quote: Beams and channels, 15-inch and under, 1.55c; 20-inch, 1.70c; 24-inch, 1.75c; angles, 1.10c; universal plates, 1.10c to 1.15c; zees, 1.30c to 1.35c; tees, 1.35c to 1.40c.

BARS.—A good sized order of bar iron is reported taken at 1.15c, which fairly represents the market. Asking rates are nearer 1.20c. The collapsed bar iron association had no hold on Pittsburg mills and no effect is seen on local conditions by reason of open competition. The market continues very weak. Muck bar has been moving some of late. Steel bars are quoted at 1c and sales below this figure are reported. Muck bar is quoted at $19.25 to $19.50.

PLATES.—Of the 500 tons of boiler and fire-box steel required by the Baldwin Locomotive Works, 350 tons were awarded a local manufacturer of high grade steel. Additional locomotive orders on which Pittsburg fire-box and boiler steel are specified, will shortly call for 400 tons. Scattered orders for tank comprise the week's business. The Great Northern elevator at Buffalo has not yet been awarded. Elevators at Chicago and Duluth are attracting local bids. A feature of the week is the appearance of new buyers whose wants for many months have been meager. Local mills continue higher quotations on tank. We quote: Tank, 1.15c to 1.20c; shell, 1.25c to 1.30c; flange, 1.35c to 1.40c.

IRON AND STEEL SKELP.—Eastern reports indicate improved demand for skelp but the local situation remains unsatisfactory. We quote: Grooved steel skelp, 1c to 1¼c; sheared, 1.07½c to 1.10c; grooved iron skelp, 1.15c to 1.17½c; sheared, 1.30c to 1.35c.

MERCHANT STEEL.—Machinery steel and soft steel bars are the more active lines, but local reports indicate no expansion of business beyond regular customers. We continue to quote: Machinery steel, 1.30c to 1.35c, base; sleigh shoe, 1.30c to 1.35c; soft steel bars, 1.20c; machine straightened, tire, 1.30c to 1.40c; spring, 1.30c to 1.35c; open-hearth spring, 1.55c to 1.60c; toe calk, 1.45c to 1.55c; tool steel, common, 5c to 7c. Special brands, 10c and upwards.

SHEETS AND TIN PLATE.—Rumored sales of No. 28 gauge in black sheets at 1.95c are credited to outside interests, as no local mill will consider such figures. Competition on the small business going is keen and is doubtless responsible for sales of this sort. Local quotations on black sheets are: No. 26, 1.90c to 1.95c; No. 27, 2c to 2.05c; No. 28, 2.10c to 2.15c; galvanized are quoted at 80 and 80 and 5 per cent off list.

WROUGHT PIPE.—Sales of the week show a falling off in tonnage but inquiries for new business are more numerous. We quote: Merchant pipe, 57 to 67 per cent; galvanized, 50 to 55 per cent; on car load lots, six tens; less than car load lots, five tens and five per cent. On merchant boiler tubes we quote: Two and a quarter inches and smaller, 70 and 10 per cent discount; two and a half inches and over, 75 and 5 per cent discount; casing, inserted joints, 57½ per cent discount; screw and socket joint, 62½ per cent discount.

OLD MATERIAL.—Reports of Western and valley business are heard at fair prices. The Pittsburg market shows no traces of recovery and stocks are held for better prices. We continue our quotations: Wrought scrap, No. 1, $10.25 to $10.50; old iron rails $13 to $13.50; old steel rails, $10.50 to $11; cast scrap, $10 to $10.25; hammered iron axles, $15.50 to $16, net; rolled iron axles, $13.75 to $14; machinery cast, $9.75 to $10; heavy melting stock, $12 to $12.50; coil spring, $10.50 to $11; leaf springs, $13.25 to $13.50; car wheels, $10.25 to $10.50.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Cincinnati. The condition of the market is unchanged; the improved outlook of two weeks ago is not so much in evidence, perhaps. Foundrymen report more inquiries, but business closed is not sufficient to give them any great encouragement. There is so little chance of profit in the work offered them that they see no reason for committing themselves to extended contracts for iron, preferring to wait for business with some money in it. There is good business in hardware lines; wire and wire nails are active, but jobbing foundries are doing little and most of them are feeble buyers. There have been some concessions lately from the Birmingham quotations maintained by the leading producers, the principal sales being to pipe foundries and to rolling mills. We quote the Cincinnati market as follows: Southern coke, No. 1 foundry, $10.25; No. 2, $9.75; No. 3, $9.25; gray forge, $9; mottled, $9; No. 1 soft, $9.75; No. 2, $9.50; Hanging Rock charcoal, No. 1, $15; to $16; Tennessee charcoal, No. 1, $13 to $14; Jackson Co. silvery, No. 1, $13 to $14; Standard Alabama car wheel, $14.75 to $15.50; Tennessee car wheel, $13.50 to $14.50; Lake Superior car wheel and malleable, $14.75 to $15.25.

Buffalo. Business continues to improve slowly. Consumers of pig iron are gradually increasing their melt and, as very few have accumulated stocks, it necessitates more frequent ordering. As a rule, however, the transactions are small and at close prices. Quotations below are on the cash basis, f.o.b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, $12; No. 2, $11.50; Ohio strong softener, No. 1, $12.25; No. 2, $11.75; Jackson Co. silvery, No. 1, $14.25; Southern, soft No. 1, $12; No. 2, $11.50; Lake Superior charcoal, $14.

Philadelphia. There is no positive movement in any line of products, and the trade is drifting along, with confidence general that the year will yet give confirmation to the predictions made of it. The fact that some of the basic iron sold by Pittsburg for Eastern delivery is to be made in Eastern Pennsylvania, by the recent transfer of the order indicates that the leading Pittsburg company is requiring all its own metal and that it is well employed on orders nearer home. Pig iron is scarcely as firm of late and a good buyer could shade inside quotations. While $11.75 to $12 is the quotation on No. 2 X foundry, a lot has been sold at $11.60, delivered, while No. 2 plain has sold at $11.25 and mill irons at $10 to $10.50. Pipe iron has been offered at $10. Virginia producers are reported to have made concessions recently to effect sales. The billet market is firm and several lots, one of 2,000 tons and one of 5,000 tons, have been sold at $18. Some sellers are quoting $18.25 with the expectation that the market will soon establish that price. It is reported that a sale of billets has been made by a Lehigh valley mill for foreign shipment, and that a small export order for skelp has been placed. In plates and shapes mills report that old business is being specified on in a more satisfactory way than for weeks. Inquiries on new work requiring plates and shapes to the amount of 5,000 tons, are likely to be closed the coming week. Bars and sheets continue very dull. We quote iron and steel bars at 1.15c to 1.20c; tank plates, 1.25c to 1.30c; angles, 1.20c to 1.25c; beams and channels, 1.70c to 1.75c up to 15 inches. There is somewhat more disposition by the mills to buy old material when it can be had at their figure. Sellers are quite unwilling, however, to stand the losses on accumulated material that some of the going bids would involve.

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G. H GARDNER President. A. I. FINDLEY, Editor.

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THE TENDENCY TO CONCENTRATION.

The word trust has been very loosely used in the attacks upon combinations that have been so general in the past year. The National anti-trust law and similar statutes made by various States are specifically aimed at organizations for the control of several corporations under one direction, by the transfer of at least a majority of the stock of each to a board of trustees, the latter being empowered to regulate production and to fix prices, the stockholders surrendering their voting power, and receiving certificates entitling them to a share in any profits. In a less rigid sense, the term trust is applied to any combination of producers in the same line of business, for the prevention of over-production and the losses of destructive competition, by putting the control of operations in a central authority. Still more loosely has the word trust been used of late in denunciation of all combinations of producing interests, even though they may not include all the producers in a given line; and this hostility has extended also to all concentration of business, even though by such centralization competition is not prevented, and prices are lowered rather than raised. It is fear of the power large corporations may wield, either in influencing legislation, or in securing special concessions in transportation rates, or in preventing others from entering upon the production of the articles they manufacture, that inspires much of the popular antagonism to big establishments, whether they manufacture oil or matches or sugar or steel, whether they sell the merchandise of a score of retail lines under a single roof.

While legislation against combinations is based on the old principle that made "engrossing," or monopoly, inimical to public policy, the root of the popular opposition to them now seems to be the large returns many of them make for their stockholders. The Standard Oil Co. is regarded as it is, because it has made and is making fabulous profits, and not because it has oppressed the people with high prices, for this it has not done. And there is more of a socialistic germ than many will be willing to admit, in the popular thinking and feeling concerning large aggregations of capital, that because they are large exert great influence. Thus it is not uncommon to have it said that one and another of the country's most prominent millionaires could not have accumulated honestly the wealth they have, in the few years since they were known to be men of small or moderate means. The complaint against a protective tariff has been, not that any one has ever demonstrated that the home buyer would have been able to buy more cheaply from foreign producers if the latter had this field to themselves, but that certain captains of protected industry have been enabled to acquire wealth rapidly. The political revolution of 1892 that was socialistic at bottom, was an expression of popular dissatisfaction with this phase of the protective regime. It could not be successfully denied that the American wage scale was the highest in the world, nor that large fortunes had been made by industrial capitalists in free trade countries. It was enough that certain American manufacturers had become millionaires within a decade or two.

So far as the feeling against combinations springs from jealousy of success, or a belief that large accumulations of wealth by a few necessarily involve injustice to the many, we have no sympathy with it. But the protest against trust abuses, against the swollen certification that generally attends the formation of a trust, and the stock jobbing attachments that are so common, is one that fair-minded men will strongly second. Moreover, those who study these centripetal movements in industry and in trade will view with regret the increase in the proportion of employes, through the wiping out of individual establishments. With every new combination the official list becomes only a fraction of the number represented in its components. The prospect that the machinist had a few years ago, of rising to the ownership of a shop, with from three or four to a hundred men in his employ, is growing steadily less with every year. So the clerk in a mercantile establishment finds that the big stores have practically wiped out the chance of proprietorship that was once within reach of the thrifty, alert and pushing, though the start was from the lowest round of the ladder. The student of American economics who makes up his mind, after looking out on Argentina and India and Russia, that there is no chance for the American farmer, may say with equal truth, as he watches the drift in manufacture and in commerce, that the chances of proprietorship there are steadily diminishing.

Yet, looking more closely into this phase of the question, what does it profit a hundred men to come up out of the ranks to the estate of employers, if 90 of them are to be pushed back again in time by the relentless hand of competition? The law of the survival of the fittest comes to the same goal of concentration in the end as the law of combination, but its operations are neither so speedy nor so kind.

Legislate as our Congresses and assemblies may against the evils of combinations, and deplore as we may some of the phases of the evolution that is making men think deeply of its outcome, the move-

ment itself seems irresistible. Thirty years of machine methods in the United States, following the war, have worked marvels of productive economy and efficiency. To do in a generation what in old-world countries, at their average pace, would have required a century or two, has called for economic machinery as advanced as our mechanical appliances. Large blocks of capital, great corporations and often the aggregation of individual capitalists or corporations, have been the method. It has not been possible to have, side by side, the results of competition and combination, on a given product, so that the effects of each on prices could be measured simultaneously. There have been instances in which combinations, succeeding a period of fierce competition, have made an advance to recoup losses; and thus the consumer has given back to the producer, for a time, some of the so-called benefits of an unrestricted market. Two notable instances of prices reduced under trust economies are the fall in oil from 24 24-100 cents a gallon in 1874 to 6¼ cents to-day, and in cotton-seed oil from 47.8 cents a gallon in 1884 to 23.5 cents to-day for standard summer yellow oil. In the iron and steel industry, which, in general, has been developed under competitive methods, there have been very marked reductions in the same periods, but accompanying them there has been a distinct concentration of capital, the bulk of the production to-day being in few hands as compared with 20 years ago. The tendency is plain, whatever the industry selected for illustration—a steady movement toward superior product and lower prices, in those lines of manufacture most highly organized, having the largest scale of operations and requiring great capital for their prosecution.

It is no more conceivable that a return will be made to the regime of modest individual enterprises than that the textile machinery of to-day will be discarded for the hand-loom. Hardships to individuals and classes appear along the way; here and there an inequality is seen in the heaping up of profit for a time in the hands of a few. But concentration has proved in the main to be in the line of progress; it has given better products at lower prices and has secured a larger command of them by the people. Judged by its fruits, it does not deserve to be put under the ban in the way that has come to be popular.

The Shafting Association Still Intact.

The association of manufacturers of cold rolled iron and steel shafting, who have maintained an agreement concerning prices for nearly two years, met at Pittsburg Thursday and Friday of last week. One or two reported infractions of the rules of the association came up for adjustment, but there was no rupture and prices for the next 30 days were agreed upon, these being in harmony with changed conditions in other lines. The association has pursued a conservative course and has maintained itself in spite of the sweeping away of similar agreements on other products.

THE Indiana Steel Casting Co., Montpelier, Ind., has completed its works, and the furnaces and machinery have been tested and found to work satisfactorily. The company is now in position to accept business and to execute orders for any size or kind of open-hearth steel castings. Within a short time the company will be able to make crucible castings, as plans are now being made for the addition of a crucible plant to the works.

PERSONAL.

Lucius S. Boomer, one of the best known men in the iron business in Chicago, died at his residence in that city on Saturday, March 6, of pneumonia, after a short illness. Mr. Boomer was born in Chicago 46 years ago, and since his graduation at Yale in the class of '72 has always been connected with the iron business. He was first associated with the American Bridge Works, of Chicago, which company was formed by Mr. Boomer's father. Later he was secretary of the Union Iron & Steel Co., which owned what are now the Union works of the Illinois Steel Co. He afterwards became general agent of the Cambria Iron Co., at Johnstown, Pa., having charge of the Gautier steel department. He then went to Park Bros. & Co., of Pittsburg. In January, 1891, Mr. Boomer returned to Chicago as the agent in the West of the Carbon Steel Co. and the Cambria Iron Co., and held that position up to the time of his death. Mr. Boomer leaves a wife and four children. His death is regretted by a very wide circle of friends, and his place, both in business and social life, will be hard to fill.

Chief Inspector George Kirby, of the Homestead Steel Works has been transferred to the Upper Union Mills of the Carnegie Steel Co., Ltd., and Inspector A. J. Park, of the Upper Union Mills has been assigned to duty at Homestead.

The friends of General Manager James M. Swank, of the American Iron and Steel Association will hear with pleasure of his improvement from his recent severe attack of the grip. While at Washington, in connection with the tariff hearings on the metal schedule, Mr. Swank took cold and for the past few weeks has been confined to his room most of the time. A sojourn at the seashore is expected to work speedy recovery, and it is hoped he will soon be able to resume his important labors.

James Purvis, formerly connected with Spang, Chalfant & Co., has been made superintendent of the open-hearth department of the Buhl Steel Co.'s plant at Sharon, Pa.

James Blair, a large stockholder in the Lackawanna railroad, in the Lackawanna Iron & Steel Co. and the Dickson Mfg. Co. is reported dying at his home in Scranton, Pa. He is in his 90th year.

Pittsburg Wage Reductions—Bessemer Firmer.

(By Telegraph.)

PITTSBURG, March 11.—The National Tube Works Co., McKeesport, and the Pennsylvania Tube Works, Pittsburg, have reduced wages 10 per cent. This step was caused largely by the low prices and slack demand for oil country products. The Standard Mfg. Co. and the Keystone Rolling Mill have also reduced wages. The Keystone Bridge Co.'s scale is kept unchanged.

Bessemer is slightly firmer, and $10.10 in the valleys is now asked.

WORK was resumed on Tuesday in the wire drawing department of the Cleveland plant of the Consolidated Steel & Wire Co. The renewal of operations in the rod mill, which has long been idle because of a disagreement with the Rod Mill Workers' Association, promises to be attended with some friction. The company refuses to pay the Cleveland scale, which is 25½ cents a ton. The total of items as proposed by the company is 19 cents. The company also insists on a new arrangement in the heating department that will displace two heaters. For certain work it pays more than is provided in the men's scale. The company expects to put outside men in the rod mill, if the Cleveland workers refuse to take their old places. Idle men from other plants of the company will be given preference.

THE Clinton Iron & Steel Co. has purchased valuable property adjoining its furnace yards on the South Side, Pittsburg, and is enlarging and extending its stock yards and ore bins. Improvements have also been made in the mill office and laboratory.

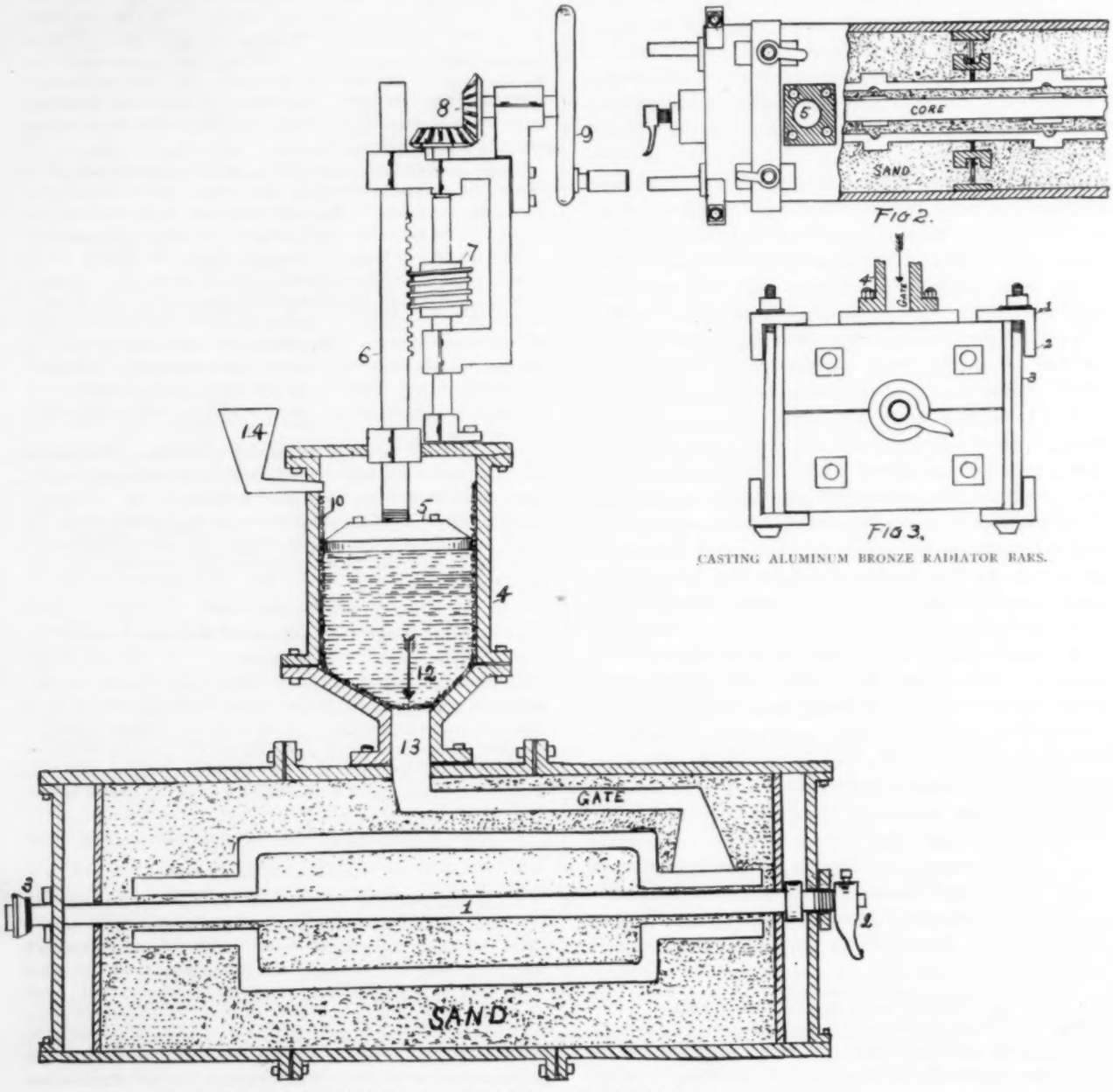
THE manufacturers of steel balls for bearings are said to have all the business they can handle; a number of them are reported to have contracts that will keep their plants running into 1898.

CASTING ALUMINUM BRONZE.

BY B. F. FELLS.

Knowing your readers to be interested in anything novel concerning practical foundry work, I have prepared a drawing and description of an apparatus I have recently completed and used with success in casting aluminum bronze into press rolls for paper mill machinery. The idea is of course applicable to the casting of other articles from the same metal. As is well known to those who have cast sleeves, bearings, shafts and similar pieces from aluminum bronze, a good deal of trouble is had from the scum. The shrinkage and oxidizing of the metal under certain influences also annoy the workmen. The machine which overcomes these difficulties is shown in section, and is of such construction that the machinist of the shop can readily build one from odds and ends from about the tool room. The iron receptacle can be made from pipe and fitted with a mouth piece provided with an opening at 13, at which point the receptacle is bolted to the mold, directly over the gate. This receptacle should be supplied with an asbestos lining 10. An asbestos bag will do. The metal is poured through 14, which is a tunnel. Now, the object is to bring a heavy and gradual force down upon the metal and force it rapidly into the mold gate. The toothed shaft 6, provided with the head 5 is made to do this by means of the gearing at 8, which gearing is turned by hand by the handle 9. The gears revolve the worm shaft 7 and the turning of the worm in the teeth of the shaft 6 depresses the latter, or raises it according to the direction the handle 9 is turned. There are plenty of shafts, beveled gears and worms in the supply room of most all foundries and machine shops and the machinist would not experience difficulty in erecting a device as per the diagram. The operation is as follows: The head 5 is brought up and the metal run into the receptacle 4. Then the handle 9 is turned and the head brought down upon the metal, which is forced through the opening 12 into the gate of the mold, the pressure breaking the asbestos bag at 12. The mold in the particular case in hand consists of the core barrel 1, wound with hemp, and swept with loam and held at one end of the half by a stud-bolt connection 3, at the other by a tightener 2. I used dry sand mixture for the halves, but ordinary core sand mixture would answer. I have also cast some rope sheaves and radiator bars advantageously on this plan, using 10 per cent alloy aluminum bronze for metal. I show in Fig. 2 the plan of the mold, with part cut away so as to show the interior. The point of attachment with the pouring device is at 5. The general arrangement of the mold does not differ materially from regular type, except in the fastenings, which as shown in Fig. 3, the end view, are odd.

These fastenings are made up of wrought iron angles like 1, bored for the bolt 3, and in tightening up the latter the lip



FIG, 1.—PLAN OF A HOME-MADE ALUMINUM BRONZE CASTING DEVICE.

CASTING ALUMINUM BRONZE RADIATOR BARS.

2 of the angle contacts with the bolt as shown, and the top lip is thus kept flat and tight upon the halve of the mold. At 4 is the gate to which the pouring device is fixed.

The process of manufacture of the aluminum, as perhaps all foundrymen do not know, consists in dissolving alumina in a molten bath composed of the fluoride of aluminum and the fluoride of some metal or metals more electro-positive than aluminum. An electric current is passed through the molten mass and aluminum is produced by electrolysis of the dissolved alumina. The pure oxide of aluminum is made from the native oxide of the metal in a mineral that is called bauxite. This mineral is found in Georgia and Alabama. The composition of the bauxite best adapted for the manufacture of alumina is as follows: Silica, 3 per cent; titanic acid, 4 per cent; oxide of iron, 2 per cent; water of hydration, 32 per cent; alumina, 59 per cent. This ore exists in the following forms: 1. In round nodules, or pisolites, some of these being in sizes up to two inches in diameter. 2. An agglomeration of these nodules into a conglomerate, the binding material between the nodules being pure alumina. 3. A massive formation. 4. A fine powdered condition in the beds at the banks.

I believe that atmospheric conditions affect the casting process of aluminum at times. The casting room should not be such as to saturate the atmosphere at a low temperature, but steam should be used to prevent this and give the necessary heat to enable the room to carry sufficient moisture and the upper ventilation will prevent the temperature from rising too high. A low studded room will soon either become too hot to get the benefits of the moisture or theatmosphere will become saturated at low temperature. A very high studded room is harder to condition and is most easily affected by outside weather than one of medium height, and while you must not strive to put heat and moisture enough into such a room as to cause saturation or "dew point," such a room can be held at a proper tempeturature and carry a large quantity of moisture. Fans for ventilation prevent the proper conditioning of the air and should be avoided, as should all currents or draughts. Ventilation shoulde b from above and enough of it allowed to keep the atmosphere in the room fresh and healthy.

Electrically Operated Coal Conveyor.

A feature of the equipment at the Johnson Co.'s steel plant at Lorain, O., that attracts the attention of visitors is the system of coal conveyance, designed and patented by Heyl & Patterson, of Pittsburg. It has a capacity of from 30 to 50 tons per hour, and if operated continuously one elevator would coal a boiler plant of 20,000 h. p. with one attendant. The operation in all respects is noiseless, and the amount of dust from the coal is reduced to a minimum, as is also the cost of maintenance and labor. Power is supplied to this system by a 5-h. p. electric motor placed on a platform some two feet above the firing floor of the boiler house. The power is transmitted by belt from the motor to countershafts on the front of the leg, from which countershafts it is transmitted by chain belting to the head shaft of the elevator, thus putting in motion the endless chain and buckets which lift the coal and deposit it in overhead tanks.

The power for moving the elevator leg is secured from the boot or lower shaft, on which are placed two friction-clutch sprockets; the chain, driven by one of the friction-clutch sprockets, transmits the power direct to a countershaft placed parallel with the truck, extending between the two traction wheels, to the axle of which the motion is transmitted by bevel gear for moving in one direction, while it is moved in the opposite direction by a chain driven by another friction-clutch sprocket. This chain, instead of passing directly around the sprocket on the countershaft, passes only over its top and around an idler sprocket, which is supported on an adjustable gudgeon, thus securing the opposite motion from that secured by the direct-acting chain.

The two clutches are connected by a yoke which is controlled by a vertical lever extending up to the motor platform. The operator stands on this platform, where he has within reach the starting and stopping rheostat and the lever. With all the machinery under control, he can, by a slight movement of the lever, move the elevator to whatever point he desires to raise coal. The buckets and chain are running continuously, and he has only to open the gate in the bulkhead, thus losing no time whatever.

RECEIVED FROM THE TRADE.

The Chicago Pneumatic Tool Co., Monadnock Block., Chicago, has just issued a catalogue of the Boyer pneumatic hammers, piston air drills, riveters, rotary drills, air hoists and compressors manufactured by it. The catalogue is on excellent paper and is standard size 6x9. It contains descriptions and illustrations of the pneumatic tools made by the company, together with reproductions of strong letters of rec ommendation from prominent concerns using the tools.

The fourth edition of the "Cahall" catalogue is neatly cloth-bound, 6 x 9 inches and contains 97 pages. Beginning with a chapter on the evolution of steam generators, which is followed by an enumeration of the twelve requirements of a perfect boiler, as laid down by the late Geo. H. Babcock, the book goes into the details of the Cahall vertical water tube boiler and its adaptation to the utilization of waste heat from puddling and heating furnaces and to the burning of blast furnace gases. Half-tone views are given of a number of prominent installations for iron and steel companies. Some description and illustration are devoted to the "flowed steel" which this company has introduced to overcome the troubles arising from the use of forged steel cross-boxes and headers.

"Electric Pumping Machinery" is the title of a handsome catalogue from the power and mining department of the General Electric Co. Following several pages of data which set forth the economies and other advantages of electric pumps, there are upwards of 30 full-page illustrations in tint, giving an idea of the wide extent of important pumping service, particularly in mines, to which the electric motor is applied.

Though of special interest to users of refrigerating equipment, the new catalogue of Westinghouse, Church, Kerr & Co. on "Refrigeration" is suggestive of the increasing employment of such apparatus in various lines of manufacturing and commercial operations. The features of the machinery built by this well-known firm of engineers are of special interest from a mechanical standpoint.

Hilles & Jones Co. present in catalogue N a series of bold photographic reproductions of their mammoth machine tools. Data concerning them are given in separate publications.

The elastic nut, its quality of locking itself where put, and the material and method employed in its manufacture, are set forth in a recent handy leaflet of the National Elastic Nut Co., of Milwaukee.

The latest catalogue of J. W. Paxson Co., Philadelphia, deals largely with wrought iron chaplets and chaplet stems. Fraser's rapping plates are also illustrated, and the company's iron filler and foundry light.

The Worthington cooling tower is described in a special catalogue just issued by Henry R. Worthington. The importance of this apparatus is indicated by the illustrations given in this publication, showing the various classes of installations made. The cooling tower depends for its effectiveness upon the capacity of atmospheric air to absorb and carry off heat and moisture by creating rapid evaporation. The condensation of steam from steam engines to get the economical effect of a vacum, and the condensation of ammonia in connection with refrigerating plants, require the absorption of vast quantities of heat, ordinarily accomplished by the use of large volumes of cold water which run to waste after being heated. Where an ample and inexpensive water supply is not available and must be purchased from a municipality or pumped from a long distance, or from deep wells by deep well or air lift pumps, which are expensive and costly to operate, the expense becomes a serious matter. The cooling of the condensing water avoids its waste and allows its continuous use at the nominal expense of circulation over the condenser and cooling apparatus. To accomplish this is the object of the cooling tower.

The city of Pittsburg has awarded to Westinghouse, Church, Kerr & Co. the contract for the electric light plant to be installed at the new pumping station at Brilliant.

By a break in the water works of the Consolidated Steel & Wire Co.'s Braddock plant the works were temporarily idle last week. All departments are now in operation.

LAKE SUPERIOR IRON MINES.

A main contention in the recent Cleveland meetings of the Bessemer Ore Association has involved the Lake Superior Consolidated Iron Mines and the Minnesota Iron Co., and constitutes what may be called the Mesabi situation. The railroad interests of the two companies are the occasion of the difference that has come up. The Consolidated company, having leased two large properties to a large consumer, is sure of a large tonnage for its road, the Oliver and Mountain Iron properties together insuring 1,200,000 to 1,500,000 tons in 1897 and probably more in later years. This tonnage is outside the control of any association. Since the producers are the sole consumers of the ore, there would be no point in association membership. On the other hand the greater part of the tonnage of the Duluth & Iron Range Road, which is owned by the Minnesota Iron Co. interest, is under pool limitations, only a small proportion of the ore hauled being non-Bessemer. The Carnegie arrangement gives the Duluth, Mesbai & Northern a long lead in the matter of business, and the Minnesota Iron Co. wants, as a condition precedent to a new pool agreement, some arrangement that will tend to a better equalization of the traffic. The Duluth, Mesabi & Northern, from carrying less than half as much ore as its rival in 1893 and three-fourths as much in 1895, took the lead last year and will greatly increase it in 1897. The distribution of ore as between the two roads in the past four years is shown in the following statement, which separates the product carried by each road for its owners and that carried for outside mines. The double lines of figures under the head of Minnesota Iron Co. ores represent in the first line Vermilion ores and in the second line Mesabi ores:

	Ore Hauled.	Minn. I. Co. Ores.	Consolidated Co. Ores.	Other Ores.
1893.—GROSS TONS.				
Duluth and Iron Range	903,329	806,233 24,416	.....	72,680
Duluth, Mes. and Northern	440,292	.....	119,818	320,474
1894.—GROSS TONS.				
Duluth and Iron Range	1,373,253	948,513 361,062	.....	63,678
Duluth, Mes. and Northern	1,361,043	.....	575,580	785,463
1895.—GROSS TONS.				
Duluth and Iron Range	2,142,572	1,037,760 965,820	.....	138,992
Duluth, Mes. and Northern	1,598,783	.....	488,538	1,110,245
1896.—GROSS TONS.				
Duluth and Iron Range	1,813,992	920,252 491,043	.....	402,697
Duluth, Mes. and Northern	1,988,932	.....	444,242	1,544,690

The table shows that the great gain the Consolidated interest has made as a carrier of ore, in the past three years, has been contributed by properties outside of itself. It has thus gained steadily in income from transportation charges, and at the same time has not increased its risk from the fluctuations of the iron ore market. Of about $1,600,000 gross revenue from its ore traffic last year, nearly $1,250,000 came from other than its own mines. The Minnesota Iron Co., on the other hand, very largely provides the traffic of its own road and its profits depend to a much greater extent than those of its rival upon the maintenance of a profitable price for ore. In case the two interests should fail to agree on a basis of ore output and prices for 1897, the probability is that the resulting struggle would not stop on ore but would extend to freight rates. The large interest on the one hand in the maintenance of the 80-cent rate, and on the other hand in the prevention of demoralization in ore, furnishes the incentive for the mutual concessions from the Minnesota giants, that now promise a continuation of the pool.

The press of the Lake Superior region, particularly in iron mining centers, is discussing seriously the new conditions forced upon the mining interest by the Carnegie deal. The Marquette range mines have an advantage in low freight, in the absence of royalty and in the quality of their ores. But the mining of hard ores is expensive in labor, in explosives, in dead work. Ishpeming *Iron Ore* gives figures for one large Marquette producer, showing an average of only 1 5-7 tons per man per day, counting 24 working days to the month. Gogebic mines can show from two to three tons per day per man, with ores more easily won. *Iron Ore* figures that Marquette ores cost something over $1 a ton to place on surface. This figure could be somewhat improved upon at Gogebic properties, where the labor cost per ton is in the neighborhood of 55 cents; but to this must be added royalties ranging from 25 to 40 cents—in the case of the Norrie 22 cents. Taxes are high on both ranges. The Norrie, for example, paid about $60,000 last year, which would be 10 cents a ton on an output of 600,000 tons. The 1896 shipments were only about 60 per cent of this, making the tax per ton about 16 cents. Figuring 80 cents lake freight and 52 cents rail freight, and making proper allowances for dead work, timbering, interest, commission and taxes, it is an exceptional Gogebic product that can be put on Lake Erie dock at $2.60. *Iron Ore* figures that Marquette range ores will cost $2.67 to put on lower lake dock, counting $1.25 for mining, 32 for rail freight, 80 cents lake freight, 20 cents for commission, insurance and expense and 10 cents for taxes. The inference from calculations like these is that if the furnaces depending largely upon old-range ores are to be able to approximate the Duquesne basis, of which so much has been said, there must be such a paring of all the items that enter into the cost, as shall give the deep mines, whether in specular or soft hematite, a lower cost sheet and at the same time a margin above cost, with the market close to the basis of 1895. Labor, taxes, royalties, upper lake rail freights, and lake freights, all will have to stand some share of the reduction forced by the new conditions.

The Leading Southern Iron Producer in 1896.

The statement of the Tennessee Coal, Iron & Railroad Co. for the fiscal year ending Dec. 31, 1896, is as follows, with comparison with 1895:

	1896.	1895. (11 months.)	Changes.
Total net profits	$692,333	$995,794	Dec. $303,461
Deduct			
Interest	660,085	582 305	Inc. 77,780
Miscellaneous	1,186	43,521	Dec. 42,335
Total	$661,271	625 826	Inc. $35,445
Balance	$ 31,062	$369 968	Dec. $338,906

The following is a comparison of floating debt and available assets as of Dec. 31:

	1896.	1895.	Changes.
Liabilities	$2,378 482	$2,172,879	Inc. $205,602
Quick assets	2,211,968	2,155 473	Inc. 56,494
Surplus	$166,514	$17,406	Inc. $149,107
Slow assets	62,566	77,878	Dec. 15,312
Bal. over floating debt	$103.948	Def. $60,472	Inc. $164,420
Ultimate assets	283,382	504,617	Dec. 221,285
Total Surplus	$179,384	$565,090	Dec. $385,705

President N. Baxter, Jr., in his report says that though the number of furnaces in blast and the weekly output of the furnaces of the United States were enormously reduced last year, the Tennessee company made approximately as much iron as in the previous year, the difference in make in 1895 over 1896 being only 2,832 tons. The successful efforts to introduce the company's products in Europe are referred to; the company's sales abroad have been between 60,000 and 70,000 tons, and the prices obtained have been fully as good as in all cases, and in many better than the equivalent of our domestic sales. The foreign business promises to be permanent. The physical condition of the property has been well maintained and many economies in reducing the cost of production have been instituted. Attention is directed to the fact that in March, 1896, the directors closed all capital accounts and all expenditures for improvements and betterments that have taken place since have been charged directly to the cost of production. The company's profits were really larger than the amount shown in the treasurer's report. There has been applied to meet depreciation in the amount of pig iron carried in stock the sum of $144,717. The first shipment of pig iron from the South Pittsburg furnaces by water has taken place, and on the completion of the Government improvements on the Tennessee River, the whole Western system of waterways and points of consumption for coal will be opened up to the company's Marion County coal field.

Comment on the report, in the *Wall Street Journal*, refers to the current floating debt as practically working capital, offset by material on hand. The fact that the company in so bad a year as 1896 earned its interest, accrued and otherwise, is considered promising. It is stated that the company's cost per ton of iron was 47 cents less in 1896 than in 1895. This was no doubt due in large part to lower wage scales. The new policy of charging all expenses to operating expenses is a move toward the practice long followed by older concerns, and is certainly in the right direction.

THE SPEIDEL SAFETY HOIST.

The construction of the Speidel economic safety hoist, manufactured by the Reading Crane & Hoist Works, Reading, Pa., is indicated by the accompanying cuts, which represent it in its usual portable form. The machine is suspended by the hook A. An endless hand chain B is laid over the large chain wheel C, which works loose on the main shaft I and to the hub of which is cast the pinion D that drives the spur wheel E, keyed to the lower shaft F. On the other end of this shaft is fastened the pinion G, which drives the internal gear H. This latter being keyed to the main shaft I turns this shaft, and consequently the hoisting sheave J, which operates the lifting chain K. One end of this lifting chain is fastened to pin L, leads around the chain sheave M of the lower block, comes up around the hoisting sheave J of the upper block, then hangs down in a loop and has the other end fastened to the pin L. As will readily be seen, the lower block, and with it the hook N is raised by pulling on the right side of the hand chain B. The lowering of the hook N is effected by moving the hand chain in the opposite direction.

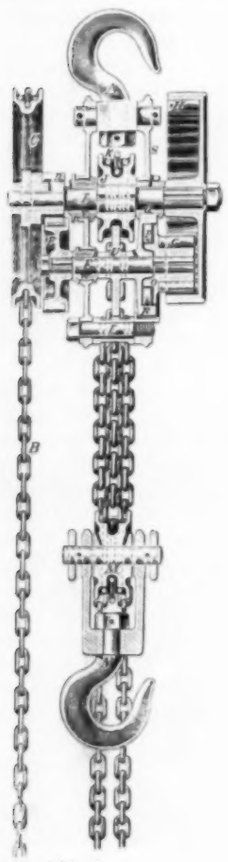


FIG. 1.

FIG. 2.

To prevent a load from running down a brake, operating with an ingenious arrangement of self-locking rollers, is secured to the lower shaft F. The pinion G has a flange with four projections, O, which form recesses for the brake rolls P, Fig. 2. The bearing on the main shaft I next to the internal gear H forms a crescent shaped saddle, Q, and rides on the brake wheel R, which rests in the main frame and produces the necessary friction to hold the load; the brake wheel is held at a standstill by the rollers P and serves as a bearing for the lower shaft F, Fig. 1. In lowering, the brake wheel moves and has to overcome the friction due to one-half of the load on the hoisting sheave J. This friction is sufficient to hold the load stationary. In overcoming this friction, by pulling on the opposite side of the hand chain B, the load will be lowered.

The lifting chain is guided by the roller T and separated by the casting U on the lower shaft F. The main and lower shaft bearings, V. W and Q are made of phosphor bronze.

Figs. 3 and 4 show the Speidel hoist, with two-speed lower block. The contrivance for securing two speeds is of value when the height of the lift is considerable and variable loads are to be lifted. In Fig. 3 the lower block is in position for the regular or slow speed. The lifting chain coming from the upper black is taken around the chain sheave of the lower block, and both sides of the chain do the lifting. In this case the load travels at half the speed of the lift chains.

Fig. 4 shows the lower block in position for the fast speed. A small pawl attached to the oscillating frame of the lower block is locking the hoisting chain to the sheave, and the hook hangs suspended only on one chain. The load is now raised or lowered at the speed of the lift chain, or twice as fast as when the lower chain sheave rests free in the loop formed by the hoisting chain. This device is self-disengaging when the load has been hoisted at the fast speed and is lowered below the point from which it has been raised. The change from the slow to the fast speed can be made at any time and while the load hangs suspended from the lower hook. It is accomplished by moving the side of the oscillating frame, to which the pawl is attached, downward as far as it will go, then turn up the pawl itself and let it catch under one of the chain links, thus preventing the chain from going around the sheave. As will be seen from Fig. 4, the side of the lift chain on which the load hangs is brought into a central position by the upper half of the oscillating frame pressing against it. When hoisting with the fast speed only one half of the full capacity of the hoist can be raised with the same power applied, owing to the load hanging only on one chain. The chain guides on the upper block are made to swivel, enabling the operator to stand on one side of the hoist when raising bulky articles. Both the upper and lower hoist hook swivel in their sockets.

FIG. 3.
LOWER BLOCK IN POSITION FOR THE REGULAR, OR SLOW SPEED.

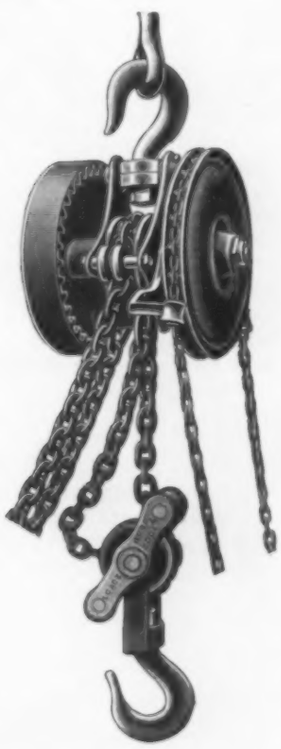


FIG. 4.
LOWER BLOCK IN POSITION FOR THE FAST SPEED.

THE Hardie compressed air locomotive to be used on the Manhattan Elevated road in New York is completed except as to some minor details, and has been tested at Rome, N. Y., working admirably. It pushed a train of ten heavily loaded freight cars on the New York Central tracks, and made 20 trips, covering eight miles, with 20 stops, without using one-half the power it stores. It is under perfect control and runs smoothly.

THE article, "A Point in Foundry Practice," appearing in our issue of February 15, was from the *Chattanooga Tradesman*. It was credited to the *Mechanical World*, Manchester, Eng.

CONCERNING THE TIN PLATE DRAWBACK.

Two instances were referred to in these columns last week, in which increased duties were urged upon the tariff sub-committee in behalf of American labor, where the capitalists interested in the industries in question had in the one case made no request for an increase, and in the other case had not asked for so much of an increase as was sought by the representatives of labor. The industries referred to were those of iron mining and of tin plate manufacture. The following, taken from the *National Labor Tribune*, Pittsburg, organ of the Amalgamated Association, illustrates also the state of labor in the abolition of the drawback in the case of imported tin plate that is sent out again in the finished form:

"The attention of the Amalgamated Association members is called to the fact that the officers of the organization are working for the support of the effort to have the drawback system omitted from the next tariff law. Many lodges have already responded by forwarding the proper resolutions to Congressinal representatives, and we trust that the others will not procrastinate. An abolition of the drawback system means much to the American tin plate industry. While there is a provision in any so-called protective measure that permtis canning establishments to import tin plate, and, after working it up, to export the cans and their contents, and get back 99 per cent of the duty paid on the plate—as long as this is permitted the term protective ill fits such a measure. It means that the canning establishments of this country can get all their product for export goods at practically the same price paid in Wales, and the American tin plate is excluded from the home market just to that extent. And as the designation of the tin plate upon which a drawback is to be paid rests solely upon the affidavit of the importer, it is obvious that the system is a most tempting invitation to fraud.

"The amount of American tin plate that is excluded and displaced by these drawback importations is immense. The last divisional estimate of drawback imports of all kinds, we believe, was published in 1893, and of the total amount tin plate made up 80 per cent. It is estimated by competent and reliable statisticians that fully one-fourth of all the tin plate consumed in this country is imported under the drawback system; or, in other words, shipped here, made up and exported again, and the price paid for it by the importer was only one per cent greater than the current quotations in Wales. It means that the market that should belong exclusively to the American industry is reduced by the drawback system. It is fair to estimate under these circumstances that the abolition of this system, combined with the adoption of a fair import duty, would increase our markets by one-fourth, and would give employment to 4,000 more tin plate workers. It is a condition worth striving for. Give the officers you assistance."

MAKING AND SELLING.

It would be better for both employer and men if they were more familiar with each other's affairs; for while the former, occasionally risen from the ranks himself, probably knows more of the manufacturing than the employe does of the selling part of the business, a common knowledge of both is often lacking. The price of every commodity, be it a milling machine or a tenpenny nail, must bear a percentage of expense which represents the cost of selling it, whether that selling is done by the manufacturer through his salesmen or by an agent or dealer. If people could or would buy direct from the maker, the cost of selling would be lessened in most cases; although few manufacturers—except those making special machinery, for the sale of which personal communication is necessary—have the means or organization to market their own product direct.

In addition to the cost of selling must be considered the office expense, the interest on investment (often borrowed money), deterioration of plant, experimental work to keep abreast of competition, bad debts which are contracted in spite of every care, catalogues and other advertising necessary to make the product known, and many smaller items which enter into the expense of every business. All these must be provided for before any profit appears. The men too often imagine that the difference between the cost and selling price is clear profit, or nearly so, and the result of this belief is seen in the too frequent failures of co-operative stores and factories, the successful ones having evidently learned to allow for the selling as well as the manufacturing cost.

The effect of this belief is to make the men discontented when they figure out this apparent profit, an the sooner it is thoroughly understood that the cost of selling is frequently more than the cost of making, the sooner some of the friction will be lessened. We do not say that the net profit is always as low as would be considered a fair return for money invested, or that the men always receive a just share of the products of their labor; but we wish to make clear the fact that making and selling are two very different things, in the belief that a clear understanding will be better for all concerned. The conditions which necessitate such an effort to dispose of manufactured articles, may be at fault, but as they exist we must deal with them as we find them.—[Machinery.

Mr. Swasey's Dividing Engine.

In concluding an appreciative sketch of Ambrose Swasey, of Warner & Swasey, Cleveland, contributed to the March *Cassier's*, John A. Brashear makes this reference to the latest problem on which Mr. Swazey has been at work:

About two years ago Mr. Swazey's firm commenced the task of constructing a dividing engine for automatically dividing circles, to be used more especially with meridian instruments where precision is of supreme importance, and where the most perfect engine that has been, or ever can be devised and constructed will be none too good for the work. It would require many magazine pages to give a history of all that has been done on this difficult problem since the days of Tycho Brahe; yet to-day the number of dividing engines that are sufficiently accurate for the demands of modern astronomical measurements may be counted on the fingers of one hand. The best engines have errors, and the question is, how much can these errors be reduced.

As one-third of an inch subtends an angle of one-second of arc at a distance of one mile, it may readily be seen how minute the measurements will be on the periphery of a circle, say of three feet diameter. As there are 1,296,000 seconds of arc in a circle and all seconds must theoretically have the same value, it is easy to concerve the difficulties of dividing a circle in which the errors shall be less than a second of arc. Homogeneity of material, proportionate parts that will equally respond to small changes of temperature, and many other factors enter into this difficult problem, aside from the final corrections of the dividing mechanism. Every approach to perfection, be it never attained, brings greater assurance to the astronomer that his results will be commensurate with the faithful and conscientious work he puts into his measurements.

It has cost an immense amount of study and application, as well as a large sum of money, but from the present indications Mr. Swazey has the promise of a full reward for his labor, as already a practical test of the engine shows that it is more accurate than any heretofore constructed. Mr. Swazey is especially interested in construction as applied to engineering and architecture, and his travels at home and abroad have enabled him to study and become familiar with much that is ancient and modern in that line.

Western Foundrymen's Association.

The next meeting of the Western Foundrymen's Association will take place at the Great Northern Hotel, Chicago, at 7.30 P. M. Wednesday, March, 17. The following paper will be read and discussed: "Phosphor Bronze," by Max H. Wickhorst; "Steel Cores," by George L. Roby. The papers and report to be presented are of great importance, and their full discussion will be of much value. Secretary Sorge urges all members to make a special effort to attend, and invites non-members to be present and join in the discussion. The committee on apprentices will present a supplementary report at this meeting.

FRANK B. POPE, of F. B. Pope & Co., investment brokers, Pittsburg, has purchased an interest in the Connellsville Sheet Iron & Tin Plate Co., of Connellsville, Pa., and has been elected general manager of the company.

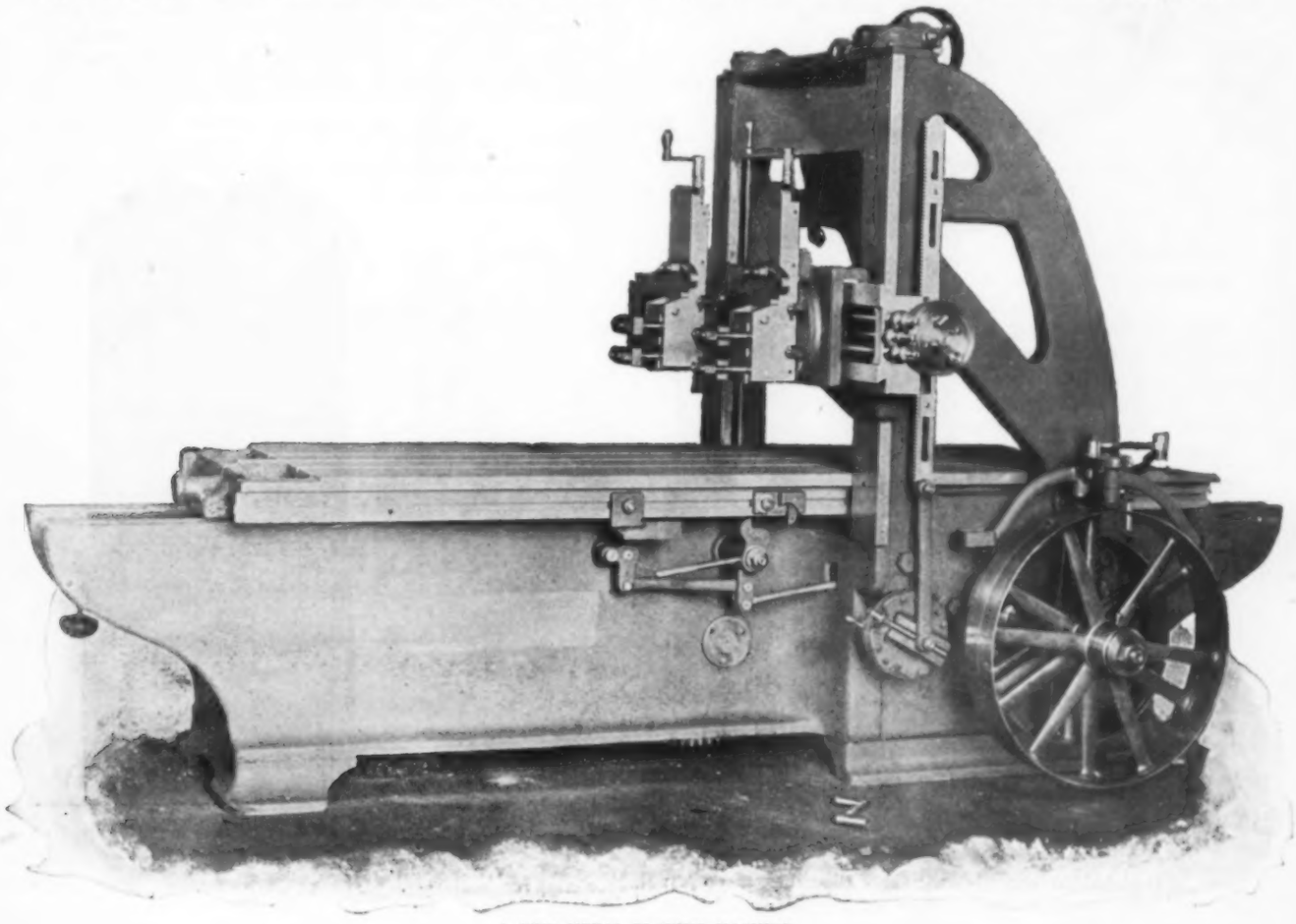
A NEW METAL PLANING MACHINE.

The patterns have just been completed for the machine illustrated herewith. They are made from new and carefully calculated designs embodying many new features in metal planing machines. The bed plate of these planers is very deep, the sides being joined together at short intervals by box ties or girders. It has been the aim in distributing the metal to avoid any undue strain in cooling of the iron. To avoid overhanging and to prevent tipping when excessive cuts are taken at the extreme width of planer, the tracks are made a greater distance between centres than ordinarily. The bearing surfaces are wide and accurately scraped to fit "V's" on the platen; and if so desired could be provided with conical oiling devices to lubricate the tracks.

The platen is very deep on its edge; it is strongly cross-ribbed and has great thickness, with a corresponding weight. "T" slots are planed and stake holes drilled and hand reamed from solid stock. The rack is also cut from solid stock, having a broad face and coarse pitch. The gearing on all sizes is arranged on the back side of the bed, being mounted on shafts of large diameter, which run in self-oiling bearings, rigidly attached to bed plate. All gears are large diameters with wide faces and coarse pitches. The driving pulleys are placed on the front side of the bed, having large diameters and wide faces; and in order to avoid liability of springing are placed close up to the bed. They can also be made to drive parallel with line shaft.

As will be seen, the housings are of the box form and are bolted to the side of the cheek piece, having a broad bearing thereon, equal to the width of the planer between the housings. The faces of the housings are very broad and carefully scraped so they will fit the cross rail. The feed work is operated by friction disc through the rack and screws to the tool head in the simplest manner possible. The cross rail is locked-gibbed to the housings and carefully scraped to fit them. It is very deep and thick, having a swelled back of ample dimensions to withstand spring when excessive cuts are taken in the center of the rail. The arch piece is very deep and rigidly bolted from the tops of the housings as well as at the sides. The elevating device is a new departure which has been adopted after careful experimenting, being comprised of spiral gears which give very smooth and easy action. On 30-inch planer and up, when two heads are on the cross rail the power elevating device is used.

This planer is now made in the following sizes: 22-inch, 24-inch, 28-inch, 30-inch, 36-inch and up. And may be had from U. Baird Machinery Co., of Pittsburg, Pa.



A NEW METAL PLANING MACHINE.

A RECENTLY issued pamphlet of the Tennessee Coal, Iron & Railroad Co. gives a full history of the property and its resources. At the end of the report is given a summary of the workings of the properties and their capacity: Pig iron sales to foreign countries from July 1, 1896, to Jan. 25, 1897, amounted to 60,880 tons, of which 29,800 tons went to England. The company can produce in a year 5,070,000 tons of coal, or a daily output of 16,900 tons. It can produce in a year 1,569,000 tons of coke, or a daily capacity of 5,230 tons. It can produce in iron ore in a year 2,100,000 tons, or a daily capacity of 7,000 tons. Its pig iron producing capacity is 1,080,000 tons per annum, or a daily average of 3,000 tons. The company owns in Alabama 240,807 acres and in Tennessee 111,741 acres, or a total of 352,548 acres.

SOME of the Connellsville coke operators seem to be preparing for the approaching exhaustion of the coal mines of that region. The Frick Company is said to be negotiating for coal properties in West Virginia, and Pittsburg parties have also been buying extensively in the same State. Few coal regions in the United States have been more actively or more closely worked than the Connellsville District in recent years, and it is not a matter of surprise that a limit to its production should be reached. Of course it will be some time yet before the mines begin to give out, but the large operators have to look to the future. It is fortunate for them that they have not to go far to find new supplies.—[Engineering and Mining Journal.

AT Lebanon, Pa., rolling mills puddling has been reduced from $3 to $2.50 a ton.

PHILADELPHIA WATER TUBE BOILER.

The water tube safety boiler built by the Philadelphia Engineering Works, Ltd., Philadelphia, has two steam drums and two mud drums, joined by straight vertical tubes and placed in a single setting. The steam drum and mud drum with their connecting tubes next the furnace are termed the front set, and those toward the chimney the rear set. Each of these sets is surrounded by walls, forming two square chambers.

The combustion chamber is external to these walls. The gases from it pass through brick arches up the first set, over the center wall and down the rear set to the chimney. Connecting tubes join the two steam drums and the two mud drums, providing ample area for strong circulation and for the equalization of the steam pressure. The vertical tubes are set in rows, extending from front to rear, the space between these rows being greater than the outside diameter of the tubes. Opposite each space in the front and rear walls openings, closed with doors, are provided to steam sweep the tubes. Through them tubes may be passed when replacing is required. No doors are provided or required in the side walls, nor are wasteful spaces between the batteries allowed.

In some types of water tube boilers the heat from the furnace is radiated to the upper ends of the tubes, where the hottest gases envelop them. Here each tube is passing all the steam generated in its entire length. It contains a mixture of steam and water, most steam when the boiler is forced. As steam is a poor absorbent of heat this intense heat will not be taken up and the tubes will be overheated, causing frequent repairs. The lower row having the severest test give way first.

In this boiler the relatively clean gases from the furnace pass among the tubes just above the mud drum, where these tubes are supplied with water unmixed with steam. In this condition they absorb the maximum of heat with the least elevation of temperature, injury or deterioration. They absorb heat and keep cool, which is transferring the heat to the water while maintaining themselves. The gases then rise among the first set and pass down the second set, enveloping all tubes alike. The water level is preferably one-fourth way up the steam drum. The most heat is received by the front set so that it expands that column of water more than the column in the rear set and circulation is commenced almost with the starting of the fire. Steam is formed in the front set first, increasing the circulation. The feed water is introduced into the rear steam drum and mingling with the water forms part of the downward current and assists the circulation. Before reaching the rear mud drum it has attained the full temperature of the water and precipitates its mineral impurities, depositing them in that drum, from which they may be blown out or removed. The drum is so situated that it receives no heat from the furnace. The purified water passes into the front drum and up the first set of tubes. The front set of tubes is then internally clean and full of water unmixed with steam when first presented to the action of the flame.

The drums are circular in form and not subjected to the flame. Their heads are dome shaped to a radius equal to the diameter of the shell. All this material, as well as that of the tubes, is subjected to a tensile strain only; these parts are made of open-hearth steel. The tube sheets are sustained largely by the tubes, but are also heavily braced and stayed. As all the tubes are straight and of the same length, one spare tube will suit for replacing any other tube.

Two styles of this boiler are made—the "standard" and the "low." As the gas current has to traverse double the length of a tube vertically and the diameter of two drums horizontally, the tubes may be much shorter than usual without reducing the gas traverse below that which is considered good practice. The manufacturers advocate the standard style or those with medium length of tubes, as the cost is less for a given heating surface, but where head room is limited the low style is suitable.

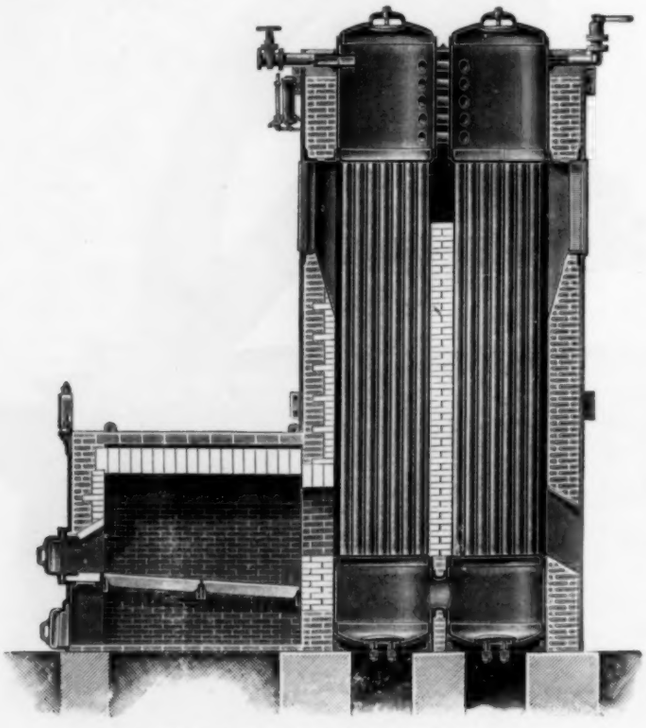


FIG. 1.—SECTIONAL SIDE ELEVATION.

FIG. 2.—SECTIONAL FRONT ELEVATION.

The Steel-Tired Wheel Co. has been incorporated under the laws of New Jersey with a capital stock of $4,000,000 to acquire various concerns now manufacturing steel-tired car wheels. The concerns included in the combination are the Paige Car Wheel Co., of Cleveland; the Allen Paper Car Wheel Co., of Pullman, Ill.; the Snow Car Wheel Co., of Ramapo, N. Y.; the Washburn Car Wheel Co., of Hartford, Conn; the McKee-Fuller Car Wheel Co., of Fullerton, Pa.; the Standard Car Wheel Co., of Philadelphia; the National Car Wheel Co., of Buffalo, and the Boise Car Wheel Co., of Scranton, Pa. These manufacturers have, it is said, sold out their respective interests to a syndicate of capitalists in New York, and their representatives have been in that city for some time concluding negotiations.

The plant of the Laconia Car Co., at Laconia, N. H., was sold at private sale on March 1 to Frank Jones, of Portsmouth, and Edward H. Gilman, of Exeter, who have formed a new company to be known as the Laconia Car Works, capital $200,000, with privilege to increase to $500,000.

THE "MODEL" GAS ENGINE.

A simple gas engine, known as the Model, invented by W. E. White and built by the Garrett Engine, Boiler & Machine Works, at Garrett, Ind., is shown in the illustration. It will be seen that with the exception of the few working parts, all of which are on the side of the engine, the latter is composedof a single strong, symmetrical casting without either cylinder-head or water-joint. The special advantages of an engine having no cylinder head to pack and no packing-joint communicating with water space, is in the security afforded against water entering the cylinder and interfering with the running of the engine.

The governor and valve-operating mechanism is sensitive and simple, being embodied in one rotating whole, working noiselessly. The gasoline valve is automatic, always remaining closed should the engine accidentally come to a stop with no one near, thereby preventing any escape of gas or gasoline to provoke an accident.

An automatic timing and ventilating valve, used in connection with the hot tube igniter, allows all burnt gas to escape from the tube after every explosion, leaving clear space for the admission of fresh gas, thus insuring the explosition of every charge of gas admitted to the cylinder. The insurance of the explosion of every charge of gas admitted to the cylinder gives the greatest amount of power possible from the amount of fuel used, and the amount of gas or gasoline consumed is always in proportion to the amount of power used.

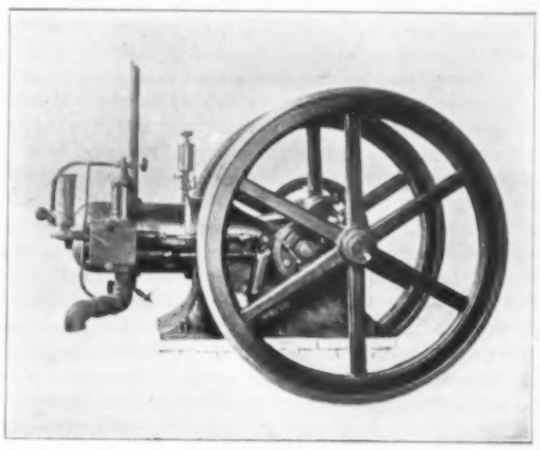


FIG. 1.—MODEL GAS ENGINE.

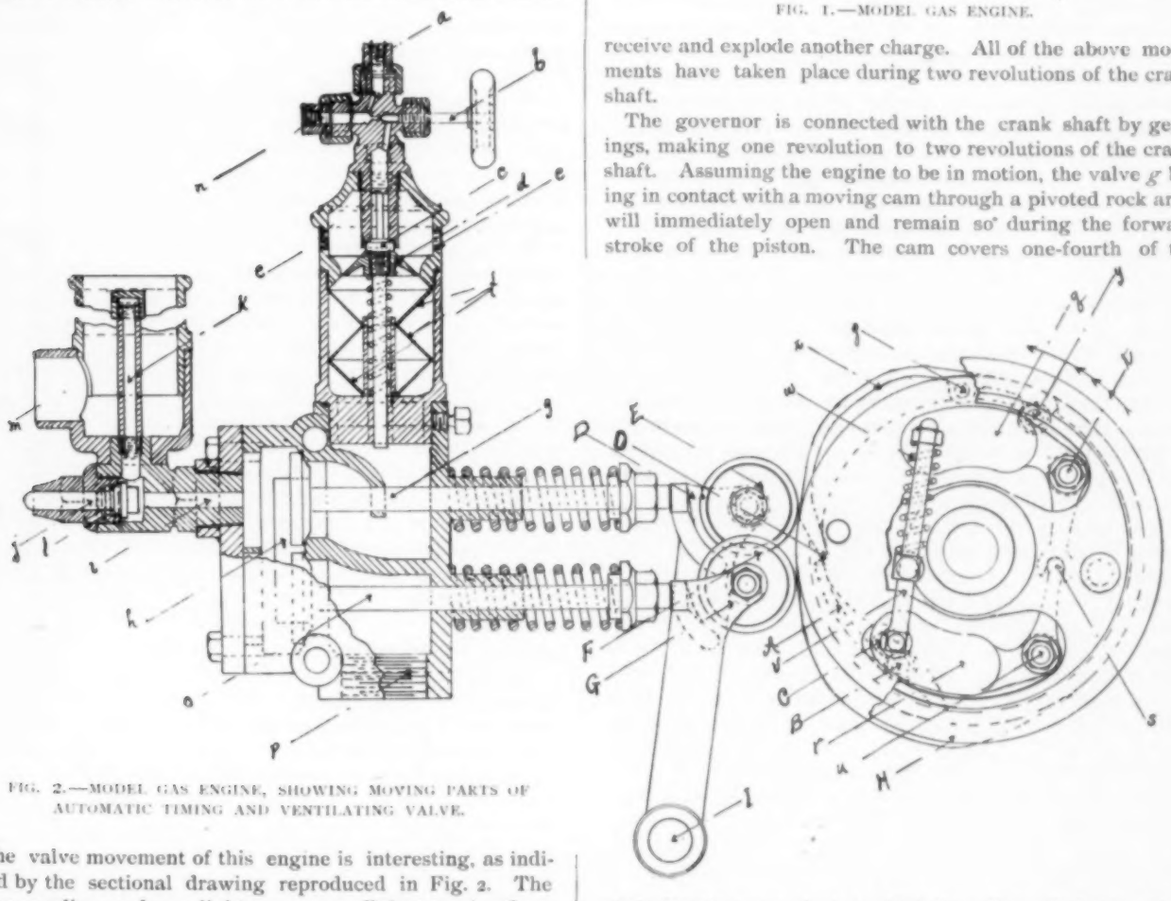


FIG. 2.—MODEL GAS ENGINE, SHOWING MOVING PARTS OF AUTOMATIC TIMING AND VENTILATING VALVE.

The valve movement of this engine is interesting, as indicated by the sectional drawing reproduced in Fig. 2. The gas or gasoline, under a slight pressure sufficient to give flow, enters at *a*, regulated by the needle valve *b* and held by the valve *c* which is opened at the proper time by a vacuum produced by a forward movement of the piston acting on the disk *d*, the air being admitted through the holse *e*. Here the gasoline mixes with a sufficient quantity of air and is vaporized, passing through a series of conical perforated disks *f*, thence through the valve *g*, thence through the port *h* into the cylinder. The cylinder being full, the valves *g* and *c* close and compression takes place by the backward movement of the piston. At the beginning of the compression, a part of the mixture passes through the opening *i* and acting upon the end of the valve *j*, which has been previously seated against the opening *i*, forces it against its opposite seat, during which time all accumulations of the previous charge, which may have remained in the opening *i* or the tube *k*, pass out through the opening *l*, placing tube *k* in readiness to receive and ignite the fresh mixture. This insures the explosion of every charge of gas admitted into the cylinder. The tube *k* is kept hot by a burner connected at *m* which is connected with the supply at n. After the force of the explosion is spent it is exhausted through the valve *o* and connection made at *p*. Upon the closing of the valve *o*, the engine is in readiness to receive and explode another charge. All of the above movements have taken place during two revolutions of the crank shaft.

The governor is connected with the crank shaft by gearings, making one revolution to two revolutions of the crank shaft. Assuming the engine to be in motion, the valve *g* being in contact with a moving cam through a pivoted rock arm, will immediately open and remain so during the forward stroke of the piston. The cam covers one-fourth of the whole rotating part, during which time the cylinder has been filled. The engine will make nearly one complete revolution before any valve action takes place, during which time the already received charge has been compressed and exploded and its force nearly spent and is exhausted by a cam and rock arm connection with the valve *o*. The speed of the engine is maintained by balanced weights acting upon a dog or catch, which alternately lock and release a movable cam as required. When the engine has reached the limit of speed, the cam is released and passes inwardly, allowing its rock arm to remain stationary, thereby not admitting a charge of gas or gasoline. Should the engine accidentally come to a stop with the valve *g* held open by the cam, the valve *c* would still remain closed, preventing the escape of gas or gasoline, as the valve *c* is operated by suction.

A FOREIGNER'S VIEW OF AMERICAN TOOLS.

Herr Von Meyenburg, a Swiss engineer, who has been making a tour of the machinery manufacturing centers of the United States, visited Worcester, Mass., and gave a representative of a local paper an interview of some length on the things he had observed about the quality of American mechanical genius and of American machinery. A few of his observations are given below. It will be noticed that Herr Meyenburg glosses over what has been regarded on this side as likely to cause a let-up in exports of machinery to Germany. He says that German designers will acquire, at length, that "common sense" to which he attributes much of American progress in machine tool manufacture, and then they will make machine tools better than ours. Judging from the quickness of German manufacturers heretofore to copy machines bought in this country, we take it that the "common sense" will begin to dawn when some of the American machines now being shipped abroad have been taken to pieces for the reproduction of patterns. In any event, it is reasonable to believe that with the amount of attention lately given American products by European mechanical engineers, our manufacturers need not expect that the present rate of shipments abroad will keep up. Certainly the business has been welcome in the impoverished condition of the home market, and while it lasts it should be made to yield a good profit. But to the interview of the Swiss visitor:

"My object in coming to this country is to buy machinery and to thoroughly investigate the design and construction of American machine-making tools. In machine-tool construction America beats the world. The finest lathes, planers and all tools used in the manufacture of other machines can be bought in this country. Foreign manufacturers are beginning to realize this and to buy largely in this country. But, on the other hand, the machines and engines which are made with the American labor and with the American tools are vastly inferior to those made in Europe. Some of your finest engines, dynamos and other machines would not hold a place in the German or Switzerland market any time at all. Your tools are better, but the machines are inferior."

"It is partly due to the labor, and partly to the men in charge. Labor is so costly here that for the same money you cannot get out equally good machines. You make them too fast, and the finish and construction are not so fine nor so accurate. Then, too, your foremen and master mechanics do not get the training that ours do. I do not want to criticise any one American mechanical school, for they are all alike. A student goes through a course of four years, and then is ready to take up his work. In the meantime he has been given a general course in theory, and, in addition, has had a smattering of the practical work. A little blacksmithing, a little lathe work, a little welding and a little something else. None of it is complete. In our schools we have a four-year course in theory. During that time we do not have a bit of work in the shop, but we study the theory very carefully. We are made to think, instead of gathering a mass of tables and figures in our heads indiscriminately. At the end of the four years we go into the shop and have two years' work there. Then we are ready to take a position.

"As a result, the German master mechanics have a tremendous amount of knowledge, and the power to apply it in special cases. But we lack the common sense and personal energy that you have in this country. You have the common sense and quick-wittedness, but lack the knowledge of the great principles. It is not the teachers' fault. You have fine teachers here; but the Americans don't want to learn; they don't think. They would rather 'sport,' I think you call it. You don't learn the languages carefully. You think that America beats the world in everything, and that there is no need of studying foreing methods. Now, there are some excellent things in Germany, which can be found out only by reading the original description in German.

"The reason why American tools are better, while the better machines make with them are found in Europe, is this: Machine-making tools do not involve the great principles that engines, dynamos and great machines do. Tools are really evolved. If a piece is found by experience to be too small, it is made heavier next time. Tools start at a simple stage, and are gradually evolved, step by step. You, in this country, apply your common sense and make the changes as a matter of course, and without much thought; while a German would spend a long time in figuring out the why and wherefore, and would be distanced by his American competitor. In the greater tasks, however, thorough and complete knowledge of the great principle is necessary.

"Manufacturing interests are greatly on the increase in Europe, and machine tools are being bought in great quantities. It is a great opportunity for the American manufacturers of tools, for the European market cannot supply the demand, and the European manufacturer prefers the American product if he can get it. The American goods are being exported largely, and that is what keeps your machine-tool shops so busy in the general dullness of trade. The opportunity may not last forever, though, for some time we will get the required common sense, and when we do, our machine tools will be better than yours."

ELECTRICITY AT DUQUESNE FURNACES.

Something of the extent to which electricity is employed in the various operations at the Duquesne plant of the Carnegie Steel Co., Ltd., apart from the lighting, may be gathered from the following, condensed from a description in the *Electrical Engineer*, New York:

There will be over forty Morgan electric cranes in the plant: all of these are driven by 220-volt direct-current motors. Each of the casting houses is equipped with two 10-ton three-movement electric traveling cranes. A 10-h.-p. multipolar motor, enclosed type, is used for the hoist—10 h. p. for bridge travel, and 3½ h. p. for carriage. The hoist and carriage motors are equipped with automatic electric brakes—the bridge motor with powerful foot brakes—an arrangement which permits of a very accurate movement in each direction. These cranes carry the pig iron to the metal breaker. Each blowing engine house is provided with a 25-ton three-movement crane of 61 feet span, a 20-h. p. motor being used for hoist, 5 h. p. for carriage, and 30 h. p. railway type motor for bridge travel. Automatic electric brakes and foot brakes are supplied, as on the cranes in the casting houses. A 50-ton electric crane of a special type, built by the Morgan Engineering Co., is erected over the metal mixer. It is a four-movement crane; two hoists, one carriage, and one bridge movement. The motors are: 100 h. p. for main hoist, 20 h. p. for auxiliary, 10 h. p. for carriage, and 30 h. p. railway type for bridge. By means of this crane the molten metal is poured from the ladles into the metal mixer. In this way metal from several different furnaces is mixed together before being run into the converters. There is a 10-ton electric crane of 50-feet span installed in the pump house. The motors therein are 10 h. p. for hoist, 10 h. p. for bridge, and 3½ h. p. for carriage.

The metal breaker is direct connected to a 60 h. p. multipolar shunt-wound motor. The breaker, which is provided with a fly-wheel 4 feet in diameter, is fed from a long table, driven, through suitable gears, by a 30-h. p. railway type Westinghouse motor. Cranes are used to lift the metal to the table. This apparatus can handle over 100 tons of pig iron per hour. Each casting house is provided with a 5-ton conveyor; this is a carriage running the whole length of the casting house, and thence to the stock yards. Its function is to carry all the scrap iron to the foot of the furnace hoist, from whence it will be taken to the top of the furnace again. A Westinghouse railway type motor moves this conveyor. The operator on the conveyor is protected from the heat by an iron cage.

Over the ore stock yard are three electric traveling bridges of 200-feet span. These were constructed by the Brown Hoisting & Conveying Co., of Cleveland, O., and are the largest ever built for the purpose. The carriages are driven by steel ropes, all the machinery, such as drums, clutches, etc., being mounted on the bridge. Two 100-h. p. Elwell-Parker shunt motors are direct connected to the drums, and enable the operator to move the bridge, carriage, and hoist at the same time. The purpose of these bridges is to unload all the ores needed for the furnaces. A 20-h. p. shunt motor drives the crushing machines in the ore-sampling department, and a 2-h. p. motor is used in the laboratory. In fact, electric motors are in use in almost every part of the plant for a large variety of purposes.

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Somebody is losing money and doesn't know it.

We attribute it to the fact that there are thousands of steam users who have never heard of the Cochrane Heaters, or, having heard of them, have not investigated them or compared them with those they do know. These Cochrane Heaters are better than the ordinary run—are better than the extra good—are better than any other appliance for a similar purpose that is sold on the market to-day, yesterday, or ten years ago. Perhaps we lack in modesty in saying this ourselves, as our customers have been and are saying it for us. But then until you happened to meet them you would be losing the advantage of a good thing—a very good thing—so we decided to pocket our pride and tell you direct. Not our word for it that these Cochrane Heaters can *thoroughly* free your exhaust steam from cylinder oil, (there are nearly a thousand of our oil separators you can refer to before you need fall back on us) that they can heat water about as hot as exhaust steam can make it, can give you "real purification," etc., and do all this without getting out of order. What do they cost? Oh! They're gilt-edged! Ask us, stating how much water you want to heat, how much exhaust steam you have and whether you want to heat your building or a dryer.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

(If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.)

The Supervising Architect, Washington, D. C., will receive sealed proposals until 2 P. M., March 30, 1897, for all the labor and materials required for a hydraulic passenger elevator, including pump, tanks, piping, car, etc., for the U. S. Court House, Postoffice and Custom House at Sioux City, Ia.

Articles of incorporation have been filed by the Norfolk Foundry & Mfg. Co., of Norfolk, Neb. The concern will manufacture gasoline engines and hot air furnaces. The officers of the company are: E. A. Bullock, president and manager; C. E. Doughty, secretary, and H. H. Patterson, treasurer.

H. C. O'Shea and associates, of Johnstown, Pa., have formed a company to manufacture structural steel work, and will organize with a capital of $50,000.

The Supervising Architect, Washington, D. C., will receive sealed proposals until 2 o'clock P. M., March 31, for all the labor and materials required for the low pressure, return circulation, steam heating and ventilating apparatus for the U. S. Postoffice building at Madison, Ind.

The Lake City Engineering Co., of Erie, has been chartered with a capital stock of $15,000, to manufacture boilers and engines.

At Blueridge, Ga., Atlanta, Northern & Knoxville Railroad will build machine shops. Ten acres of land has been secured as a site. Joseph McWilliams is general manager, Marietta, Ga.

The Pomona Terra Cotta Co., Pomona, N. C., asks prices on a second-hand iron lathe, swing not less than 36 inches.

The Talladega Milling Co., Talladega, Ala., is in the market for a bolt cutter, engine and boiler and belting.

The machine shop of Geo. T. McElderry and S. R. Bingham, Talladega, Ala., has been leased to W. E. Quinn, who will buy additional machinery.

New Construction:—

The project for a new plant for the National Tin Plate Co., Anderson, Ind., to be erected somewhere in the Pittsburg district, and the promised erection of a tin plate mill near Sharon, Pa., referred to in a dispatch from the latter place are identical. The National Tin Plate Co. has chosen a Sharon site and the Shiffler Bridge Co. has the contract. The main building will be 530 feet long and 105 feet wide.

The Dickson Mfg. Co., of Scranton, Pa., has just contracted with the Berlin Iron Bridge Co., of East Berlin, Conn., for the erection of a large steel building, to be used as a boiler shop. The shop will be equipped with the best designs of boiler-making tools, a 12-foot gap riveter, power bending rolls, electric cranes, complete facilities for drilling shells for boilers and a full pneumatic equipment. The company is also adding some new machine tools to its machine shop.

The Shiffler Bridge Co., of Pittsburg, has received a contract for the erection of three iron and steel buildings for the Michigan Alkali Co., at Wyandotte, Mich. The dimensions will be as follows: 95 x 112 feet, 60 x 112 feet and 35 x 112 feet. The company has also received a contract for the erection of an iron building with a 50-foot main span and 750 feet long, to contain a new crucible tool steel plant to be erected by Wm. Metcalf, of Pittsburg, and others. The new plant will be built at Braeburn, on the Allegheny Valley Railroad, about 20 miles from Pittsburgh, and the product will consist of high grades of crucible tool steel.

Riter & Conley, of Pittsburg, have received a contract from King, Gilbert & Warner, of Columbus, to do the structural work on the new furnace to be erected at that place.

The Keystone Gas Engine Co., Beaver Falls, Pa., expects to erect new works to include machine shops and foundry, to be run by two 10 h. p. gas engines.

The Fairmount Steel Co., Philadelphia, is to erect a foundry 76 x 96 feet.

Contracts have been let for the new buildings of the Walsh & Weidner Boiler Works, at Chattanooga, Tenn.—a main building, flanging department, machinery department, store room, steel department building, and office.

The bill allowing the Pittsburg, Monongahela & Wheeling Railroad to construct a bridge across the Monongahela River passed the House on Wednesday last.

Additions, Enlargements, Removals, Etc.:—

Ground has been broken for the large new foundry and pattern warehouse that will be added to the Laidlaw-Dunn-Gordon Co.'s plant at Cincinnati.

The Leechburg (Pa.) Foundry & Machine Co. is building a $50,000 addition to its plant. The increase in their orders for rolls necessitated the improvement. The firm has orders that will keep the works running for several months.

The recently organized Board of Trade at Sharpsville, Pa., is making efforts to induce the Derwent Foundry Co., whose plant at Ellwood City, Pa., was recently destroyed by fire, to rebuild at Sharpsville. The Derwent company, it is reported, requires a bonus of $30,000, which has so far been refused.

The Slaymaker-Barry Co., of Connellsville, Pa., will further increase the capacity of its plant. A new building is to be erected at once, to be used as an enameling house. It will be of corrugated iron. The contract has been let to the Schultz Iron & Bridge Co., of Pittsburg.

Fires and Accidents:—

Fire in Coombe & Carthew's foundry and machine shop, Lambertville, Pa., partly destroyed the building, with a loss of $6,000, half of it on patterns.

A ladle of molten metal was upset in the converter building of the American Iron Works, South Side, Pittsburg, March 7, and three men were terribly burned, one probably fatally.

The plant of the Farrell & Rempe Co., at Carroll and Sacramento aves., Chicago, was damaged by fire March 4 to the extent of $40,000. The loss is fully covered by insurance. The company manufactures cold storage supplies and ice machinery.

MOUNT SAVAGE FIRE BRICK.

UNION MINING CO.,

Proprietors of the CELEBRATED Mount Savage Fire Brick

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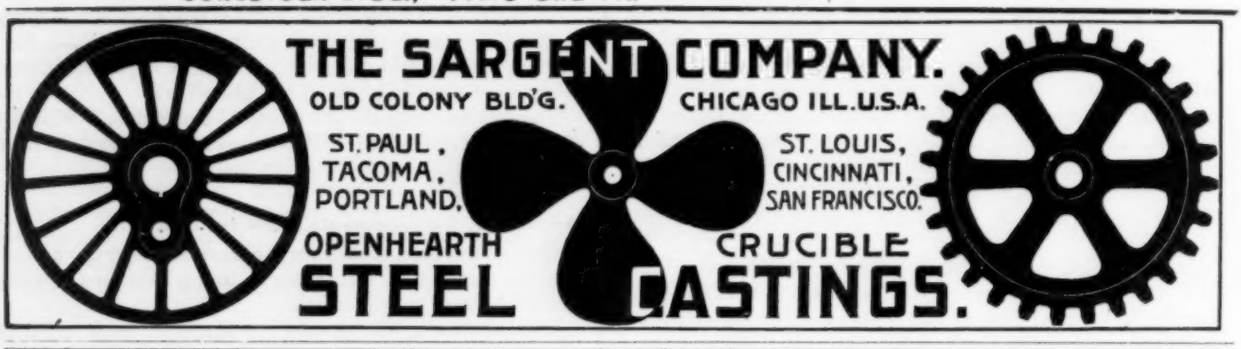


General Industrial Notes:—

The report of the Pennsylvania Steel Co. for 1896 shows that the operation of the Steelton plant resulted in a loss of $113,309, after charging to operating expenses $194,001, which was expended in improvements to the Bessemer department, and extensions and additions to bridge and consrtuction department and frog and switch department, or a net gain for the year of $80,692. The operation of the Maryland Steel Co. shows a loss, after all charges, of $121,396 against a loss of $35,920 in 1895. The total sales and deliveries in 1896 were $5,865,932 as compared with $6,679,656 in 1895. The output of the Bessemer department was 112,000 tons against 157,000 tons in 1895. The output of steel rails was 68,700 tons against 122,000 in 1895.

Work has begun on putting in place the equipment of the new Buhl steel plant at Sharon, Pa., for which Lloyd Booth & Co., of Youngstown, have the contract.

Martin's Ferry Furnace of the Wheeling Steel & Iron Co., at Martin's Ferry, O., resumed March 4 after an idleness of several months.

The Riverside Steel Works at Benwood, W. Va., resumed work March 1, 1,500 men going to work after an extended idleness. Repairs have been made in all departments.

Robert W. Hunt & Co., the Rookery, Chicago, have been engaged by Chicago to inspect and test the material entering into the construction of one 14,000,000-gallon pumping engine purchased from the Holly Mfg. Co., of Lockport, N. Y., and six 20,000,000-gallon pumping engines to be furnished the city by Henry R. Worthington, of New York City. The company will also supervise the erection of the pumps and represent the city in making the final duty tests. The Holly Mfg. Co.'s contract is to be completed within four months, but the other will extend over a period of 18 months.

The re-incorporation of the New Jersey Zinc Co. ends long litigation. The companies had been fighting for 35 years. The new company embraces five concerns: The New Jersey Zinc & Iron Co., the Lehigh Zinc & Iron Co., the Florence Zinc Co., the Passaic Zinc Co., and the Mineral Point Zinc Co., of Wisconsin.

The mill of the W. DeWees Wood Co., of McKeesport, resumed operations in departments 4, 5, 6, 8 and 9 this week, giving employment to 300 men.

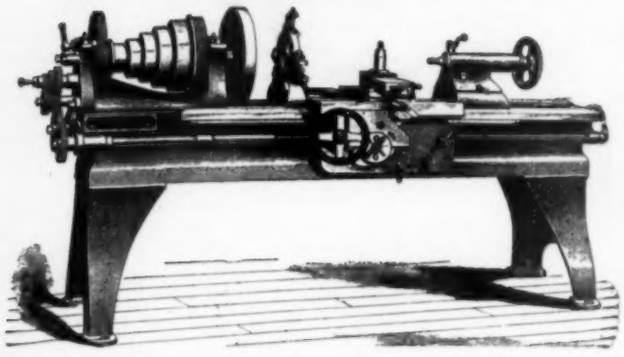
Proceedings have been begun to wind up the affairs of the Isbell Machine Co., of Woodlawn, N. Y., which has not been active for several years. The company was incorporated in 1887, to manufacture gas engines and railroad switches.

A 10 per cent reduction will be in effect at Furnace B, at Sparrow's Point, Md., when it starts up in the next fortnight.

The corporation heretofore doing business in New Jersey,

U. BAIRD MACHINERY CO.

123 AND 125 WATER STREET, **PITTSBURG, PA.** 124 AND 126 FIRST AVENUE.



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Phosphor Bronze ("Elephant Brand") Castings, Coolers, Tuyeres and Cinder Notches for Blast Furnaces supplied promptly.

Rolling Mills, Steel Works, Blast Furnaces Coal and Coke Works, Power Houses for Electric Street Railways, etc., promptly fitted up by Experienced Workmen.

AIKEN Duplex and CRITCHLOW Valves, either three or four way, for operating Mill and Hydraulic Machinery of all kinds under any desired pressure, and Stop Valves for same.

Agents for the CAMERON STEAM PUMP, which is made in every possible variety, and suitable for all purposes to which Steam Pumps can be applied.

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New York and elsewhere under and by the name of W. A. Crook & Bros. Co. has recently, pursuant to the laws of the State of New Jersey, changed its corporate name to Lambert Hoisting Engine Co., under which name it will continue to do business in the same line as heretofore. Lambert Hoisting Engine Co. will receive all the assets and pay all the liabilities of the W. A. Crook & Bros. Co.

The Totten & Hogg Iron & Steel Foundry Co., Pittsburg, Pa., manufacturer of rolling mill machinery, tin plate mills, engines and rolls, continues to be very busy. Good orders are coming in regularly, particularly for chill rolls. The company had orders from different concerns in the past week for from between 50 and 60 tons of sheet and tin mill rolls.

The works of Henry R. Worthington, manufacturer of steam and electric pumping machinery, have recently received a contract from the Newport News Ship Building & Dry Dock Co. amounting to $100,000, covering pumps for the U. S. battleships Kearsage, Kentucky and Illinois. They are also building the pumps and pumping machinery for the U. S. battleship Alabama, now being constructed by the Wm. Cramp & Sons Ship & Engine Building Co. The contract for the pumps for this vessel amounts to $33,000. The company has just completed and delivered the hydraulic machinery for operating the turrets on the U. S. battleship Iowa. More recently it has received a contract amounting to $15,000 covering the pumps required for the armored cruiser being built by the Wm. Cramp & Sons Ship & Engine Building Co., for the Japanese Government. The Yoshi-No, another Japanese cruiser, is already fitted out with a full complement of Worthington pumps. The fact that with few exceptions all British and other foreign war vessels are equipped with these machines is a testimonial to the high efficiency of the Worthington Duplex Steam Pump.

The American Steel Casting Co., Sharon, Pa., will ship eight government gun carriags to Washington this week.

The Union Pacific Railroad has awarded the contract for the proposed viaduct to carry the tracks over the leading thoroughfares in Omaha, Neb., to the Pencoyd Iron Works of Philadelphia, Pa. All iron is to be delivered by May 1, and the contract amounts to about $100,000.

The Spang Iron & Steel Co., at Sharpsburg, Pa., started its blooming mill and open-hearth furnace Monday, giving employment to 200 men after an idleness of nearly two months.

Moorhead Bros. & Co., Sharpsburg, Pa., started their iron and steel works with a full force March 8. For the previous two weeks the mills were closed down for lack of orders.

At Dubuque, Ia., the Iowa Iron Works, at which the torpedo boat Ericsson and the revenue cutter Windom were constructed, was sold by the sheriff March 6 for $43,000 to the German Bank, holder of a mortgage for $57,000. The plant originally cost $150,000.

The La Capital Co., of Buenos Ayres, Argentine Republic, South America, has let contract for the materials for a power station and the necessary equipment for the power in the station, and the roadbed and cars to firms in the United States. The Berlin Iron Bridge Co., of East Berlin, Conn., has the contract for furnishing the skeleton steel work of the building and the roofs. The roof over the engine and dynamo room will be covered with corrugated iron lined with fireproof anti-condensation roof lining.

The Weimer Machine Works Co., of Lebanon, Pa., has received an order from the Buffalo Furnace Co., Buffalo, N. Y., for a 50 x 96 x 60-inch blowing engine. The engine will be an exact duplicate of the engines the Weimer company built for the Rosena Furnace Co., New Castle, Pa, last year.

The report that the Riverside Iron Works, Wheeling, W. Va., will erect a tin mill is incorrect.

Wm. Tod & Co., Youngstown, engine builders, have a number of important orders on hand and the works are in operation in all departments.

The steamer Iron Age, recently bought by Capt. W. B. Rodgers, owner of Gray's Iron Line, took from Edgar Thomson Steel Works, Braddock, last week a tow of 14 model barges, containing 8,700 tons of rails, consigned to various Southern points. This is the first shipment of steel products

by Gray's Iron Line and is the beginning of similar shipments by the company. It is figured that 11 trains of 30 cars each would be required to transport this cargo by rail.

The Brown-Bonnell Iron Co., Youngstown, O., is operating its railroad spike mill double turn as a result of recent railroad orders. It is a long time since this department was operated so fully.

The Ohio Steel Co.'s plant, Youngstown, O., has been operated much more fully since Jan. 1 than in any preceding two months for a year. There has been a good run of orders of late and steady inquiry.

Richardson & Co., Inc., Pittsburg, have removed their offices to 901-2 Publication Bldg.

W. F. Patterson, Pittsburg, representative of the Erie City Iron Works, has removed his office to 1319-1320 Park Bldg.

The Consolidated Steel & Wire Co. has leased offices in the Tradesmen's Building, Pittsburg, and will remove at once with its general offices.

The Jennings Bros. plant at Leechburg, Pa., which was sold by the receivers at public sale on Tuesday, March 2, was bought in by the judgment creditors, who were represented by H. G. Wasson. The record of the sale was filed with the court on Saturday, March 6, and the plant will now, in all probability, be disposed of at private sale.

The strike at the Globe Iron Works Co.'s shipyard, Cleveland, which resulted in the idleness of 600 employes, was settled March 8. The scale signed by the company provides for a minimum wage rate of $1.50 a day for " shed "men and unskilled painters, double pay for holidays and time and a half for Saturday afternoons. The scale is an advance of 10 cents a day for some of the men. There is no pledge by the company to employ none but union men. The strikers are to be taken back as rapidly as possible and it is expected all will be at work in two or three weeks.

The Bucyrus Steam Shovel & Dredge Co., South Milwaukee, Wis., has received orders sufficient to run the plant for several months on full time.

Boston has bought a considerable amount of cast iron pipe. One contract for 4,050 tons has been awarded to the McNeal foundry at $18.73, Fitchburg Railroad delivery and $17.67 for Boston & Albany delivery. A second, for 3,370 tons, went to R. D. Wood & Co., at $17.67, the same firm taking .he third, 5,060 tons, delivery at Boston Gas Light Co. for $17.47 and delivery at N. Y., N. H. & H. Railroad for $18.17. The fourth, 4,580 tons, went to R. D. Wood & Co., for $16.97, Boston Gas Light Co. delivery, and $17.67 for N. Y., N. H. & H. Railroad delivery—all net tons.

Bristol furnace, Bristol, Va., is being repaired and will be put in operation about May 1.

The two tin mills of the Lalance & Grosjean Mfg. Co.'s plant at Harrisburg, Pa., have been in full operation for the past five or six weeks and the sheet mill has been put in operation this week. An additional tin mill will be started by the middle of this month. This will put the plant in full operation, and the prospects are such as insure a steady run for the balance of this year. The product of these mills is being shipped almost exclusively to the company's factory at Woodhaven, L. I.

A 10 per cent reduction has been made in the Monongahela Steel Works at McKeesport, Pa., and at the National Tube Works a reduction has been announced ranging from 5 to 12 per cent, laborers receiving $1.20 under the new arrangement. The management says that it has postponed this action as long as possible in the hope of a change for the better in the pipe trade, but competing mills have made cuts and demand is still halting, the only alternative being to scale down. The hope is that business will improve and that more regular operation of the plant may be possible.

The works of the Peninsular Car Co., Detroit, closed down last week.

The Sloss Iron & Steel Co. will build 100 coke ovens at its Alabama plant.

It is said that the Wisconsin Central will soon place an order for cars. The Michigan Peninsular Car Co., Detroit, has been building 150 flat cars for the Northern Pacific. Receivers of the Union Pacific ask permission to order 1,000 new cars. The Chicago, Hammond & Western has contracted for 100 stock and 40 flat cars with the Haskell & Barker Car Co. The Mexican Central will buy 600 freight cars. Among expected locomotive orders are those of the Mexican Central, for 20; the Big Four, for 2; the Bessemer (Carnegie) Road, for 8. The Pennsylvania Road will build 10 moguls.

The Brush Electric Works, Cleveland, having been abandoned, the greater portion of the equipment being moved to Schenectady N. Y., it is proposed to let out the Cleveland works to various smaller industries. The expectation is that the power equipment would suffice for a dozen small manufacturing concerns, and negotiations are now under way with a number of enterprises.

The name of the old house of J. W. Paxson & Co., Philadelphia, established in 1855, has been changed to J. W. Paxson Co., incorporated under the laws of Pennsylvania. The company will look after the manufacturing of foundry facing and supplies. Its capital is $450,000. The Lumberton Sand Co., chartered by the same persons under the laws of New Jersey, will attend to the company's molding sand interest in that State, with a capital of $150,000. The new officers are: J. K. Bougher, president; Howard Evans, vice-president; H. M. Bougher, secretary; Wm. W. Wood, treasurer. Mr. Paxson is still with the company and holds a large block of stock, but would not accept any office, as he has retired from active business.

The Water Board, of Hartford, Conn., has awarded the contract for 36,200 feet, 26 to 6-inch water pipe to R. D. Wood & Co., Philadelphia, Pa., at $18.95 per gross ton.

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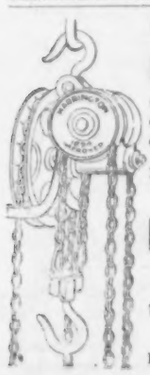

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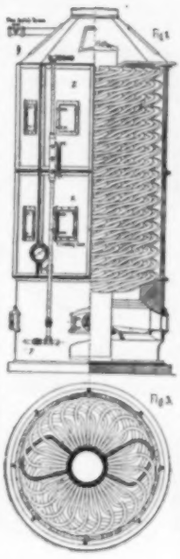

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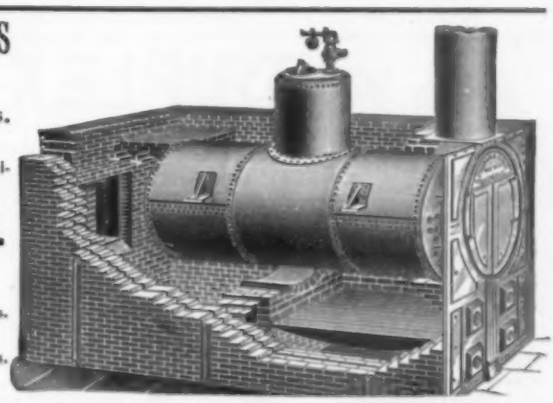

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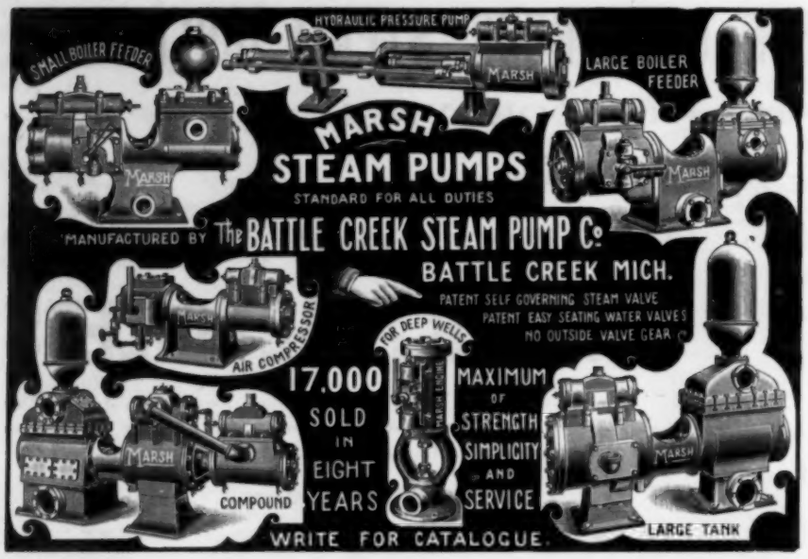

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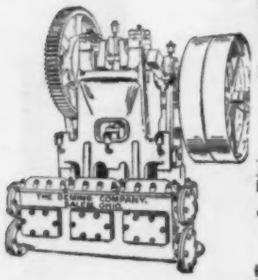

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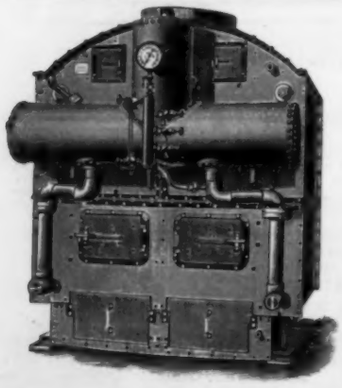

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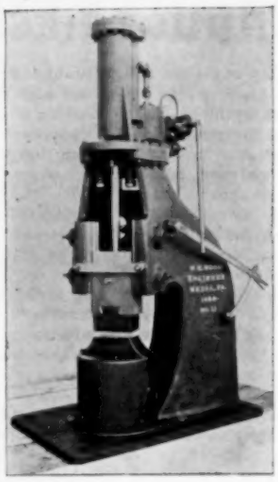

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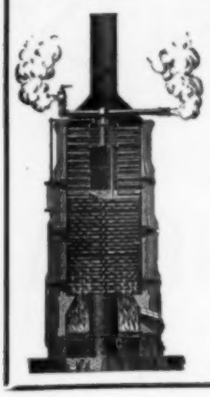

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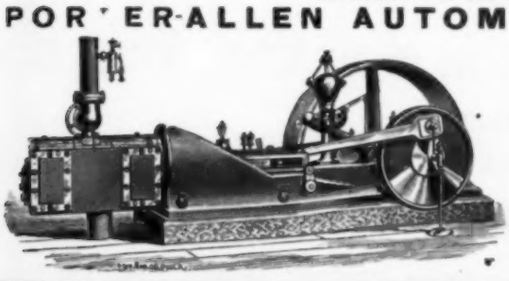

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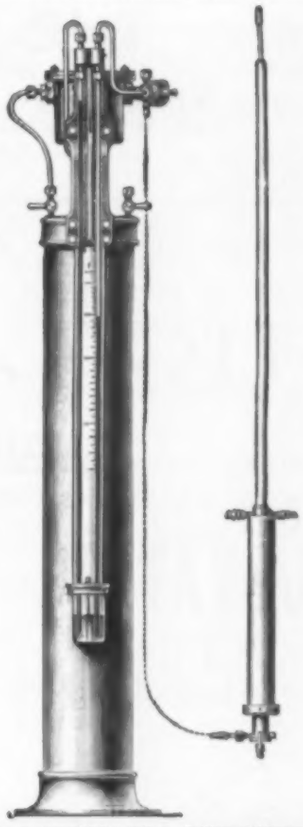

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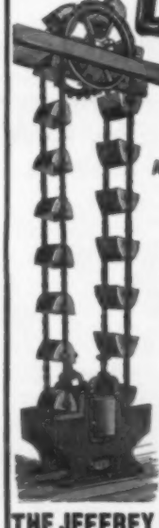

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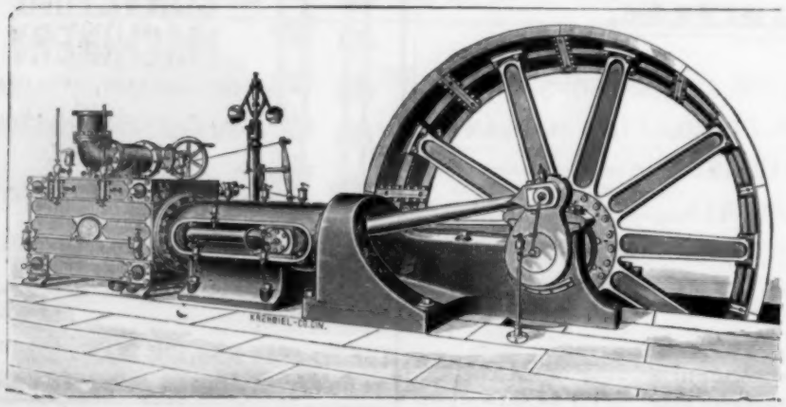

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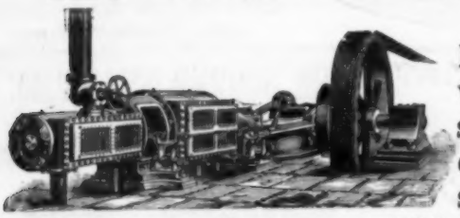

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Pneumatic Appliances—
Clayton Air Compressor Works, New York.

Polishing Machines—
Diamond Machine Co., Providence, R. I.

Portable Forges—
Buffalo Forge Co., Buffalo, N. Y.
C. H. Besly & Co., Chicago, Ill.
B. F. Sturtevant Co., Boston, Mass.

Presses—
Toledo Machine & Tool Co., Toledo, O.
Bertsch & Co., Cambridge City, Ind.
C. H. Besly & Co., Chicago, Ill.

Pulleys—
W. A. Jones Foundry Co., Chicago, Ill.

Pumps (Steam)—
Battle Creek Steam Pump Co., Battle Creek, Mich.
Deming Co., Salem, O.
The Edward P. Allis Co., Milwaukee, Wis.
Atwood & M'Caffrey, Pittsburg, Pa.
Henry R. Worthington, Brooklyn, N. Y.
Hughes Steam Pump Co., Cleveland, O.
Stilwell-Bierce & Smith-Vaile Co., Dayton, O.

Pyrometers—
Edward Brown, Philadelphia, Pa.
Uehling, Steinbart & Co., Ltd., Newark, N. J.

Radial Drills—
Dietz, Schumacher & Boye, Cincinnati, O.

Railway Supplies—
Cleveland City Forge & Iron Co., Cleveland.

Riveting Machinery—
Wm. H. Wood, Media, Pa.

Rock Drills—
Rand Drill Co., Chicago, Ill.

Rolling Mill Machinery—
The Lloyd-Booth Co., Youngstown, O.

Rolling Mill Supplies—
Atwood & M'Caffrey, Pittsburg, Pa.

Roofs—
Shiffler Bridge Co., Pittsburg.

Sand and Chill Rolls—
The Lloyd-Booth Co., Youngstown, O.
Lorain Foundry Co., Lorain, O.

Saws—
Peter Gerlach & Co., Cleveland.

Screens for Coal Ore, Etc.
Robt. Aitchison Perforated Metal Co., Chicago.
Harrington & King Perforating Co., Chicago.

Screws—
Illinois Screw Co., Chicago, Ill.
C. H. Besly & Co., Chicago, Ill.
Upson Nut Co., Cleveland, O
Chicago Screw Co., Chicago, Ill.

Shafting—
The Lane & Bodley Co., Cincinnati, O.

Shearing and Punching Machinery—
Bertsch & Co., Cambridge City, Ind.
Toledo Machine & Tool Co., Toledo, O.
Wm. H. Wood, Media, Pa.

Sheet Iron—
Cleveland Rolling Mill Co., Cleveland.
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Special Machinery—
Toledo Machine & Tool Co., Toledo, O.
Edwin Harrington Son & Co., Philadelphia.

Steam Boiler Inspectors—
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.

Steam Pipe and Boiler Covering—
C. H. Besly & Co., Chicago Ill

Steam Packing—
C. H. Besly & Co., Chicago, Ill.

Steam Hammers—
Beaudry & Co., Boston, Mass.

Steam Shovels and Dredges—
Bucyrus Steam Shovel & Dredge Co., Bucyrus, O
Marion Steam Shovel Co., Marion, O.

Steam Separators—
Jas. L. Robertson & Sons, New York.

Steam Specialties—
C. H. Besly & Co., Chicago, Ill.

Steel—
Wm. Jessop & Sons, Ltd., New York, N. Y.

Steel Castings—
Wm. Jessop & Sons, Ltd., New York, N. Y.
The Sargent Co., Chicago, Ill.

Steel Rails, Blooms and Billets—
Cleveland Rolling Mill Co., Cleveland
Bethlehem Iron Co., South Bethlehem,
Cambria Iron Co., Johnstown, Pa.

Steel Stamps and Stencils—
J. H. Fleharty & Co., Cleveland.

Stokers—
Playford Stoker Co., Cleveland, O.
Brightman Furnace Co., Cleveland, O.
Westinghouse, Church, Kerr & Co., Pittsburg, Pa.

Tanks—
S. Freeman & Sons Mfg. Co., Racine, Wis.
Enterprise Boiler Co., Youngstown, O.

Tinning Machinery—
The Lloyd-Booth Co., Youngstown, O.

Tin Plate—
Ætna-Standard Iron & Steel Co., Bridgeport, O.

Tools—
L. S. Starrett Co., Athol, Mass.

Tool Steel—
Wm. Jessop & Sons, Ltd., New York, N. Y.
C. H. Besly & Co., Chicago, Ill.

Transmission Machinery—
Link-Belt Machinery Co., Chicago, Ill.

Tube Welding—
S. Fix Sons, Cleveland.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.

Twist Drills—
C. H. Besly & Co., Chicago, Ill.

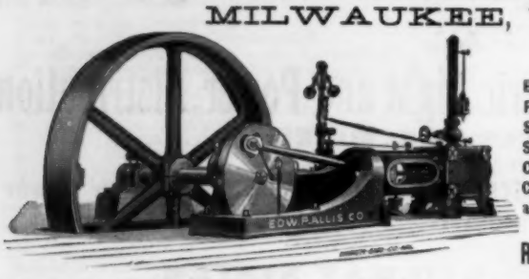
Valves—
C. H. Besly & Co., Chicago, Ill.
Jenkins Bros., New York City.

Ventilating Fans—
Buffalo Forge Co., Buffalo, N. Y
B. F. Sturtevant Co., Boston Mass.

Wire Machinery—
John Adt & Son, New Haven Conn.

THE EDWARD P. ALLIS COMPANY

MILWAUKEE, WIS.



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Blowing Engines, Hoisting Engines, Pumping Engines, Air Compressors, Special Engines for Electric Lighting Street Railways and Rolling Mills, Ore Crushers, Crushing Rolls, Stamp Mills, Concentrators, General Mining, Milling and Smelting Machinery.

Reynolds Corliss Engines.

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The Iron Trade Review

Pays special attention to iron ore, blast furnace, rolling mill, foundry and machine shop interests. Per year **$3.00.**

Alphabetical List of Advertisers.

The star (*) indicates that the adv. appears alternate weeks; the dagger (†) once a month; the double dagger (‡) once in three weeks; the parallel (‖) three times out of four.

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IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	$4.50@4.75
No. 1 Bessemer hematite	4.00@4.25
Hematites No. 1 non-Bessemer	2.25@2.50
No 1. Specular, non-Bessemer	2.75@3.00

PIG IRON.

CLEVELAND (f. o. b. cars):

Bessemer	$... ... 10 90
No. 1 Strong Foundry	11 25@11 50
No. 2 Strong Foundry	10 50@11 00
No. 1 Gray Forge, red short	... ... 9 50
No. 2 Gray Forge, neutral	... ... 9 75
No. 1 American Scotch	... ... 11 40
No. 2 American Scotch	... ... 10 90
Lake Superior Charcoal	... ... 13 50

PITTSBURG:

No. 1 Foundry	$11 00@11 25
No. 2 Foundry	10 25@10 50
Gray Forge	... ... 9 50
White and Mottled	... ... 9 25
Warm Blast Charcoal	15 00@16 00
Cold Blast Charcoal	... ... 20 00
Bessemer	10 50@10 65

CHICAGO:

Lake Superior Charcoal	$13 50@$14 00
Local Coke Foundry No. 1	11 50@12 00
Local Coke Foundry No. 2	11 00@11 50
Local Coke Foundry No. 3	10 75@11 00
Local Scotch Foundry No. 1	11 50@12 00
Local Scotch Foundry No. 2	11 00@11 50
Local Scotch Foundry No. 3	10 75@11 00
Southern Coke No. 1	11 00@11 25
Southern Coke No. 2	10 40@10 65
Southern Coke No. 3	10 00@10 15
Southern No. 1 Soft	10 90@11 25
Southern No. 2 Soft	10 15@10 25
Southern Silveries	11 40@11 60
Jackson Co. Silveries	14 00@16 05
Ohio Silveries No. 1	15 00@15 50
Ohio Silveries No. 2	14 50@15 05
Ohio Strong Softeners	14 00@14 20
Alabama Car Wheel	16 00@16 50
Malleable Bessemer	12 00@12 25
Coke Bessemer	13 00@13 50

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$10 25@10 50
Southern Coke No. 2 and No. 1 Soft	9 75@10 00
Hanging Rock Coke, No 1	12 50@13 50
Hanging Rock Charcoal No. 1, Fdy	15 00@16 00
Tennessee Charcoal No 1	13 00@14 00
Jackson County Silvery No 1	13 00@14 00
Southern Coke, Gray Forge	... ... 9 25
" " Mottled	... ... 9 25
Standard Alabama Car Wheel	14 75@15 50
Tennessee " "	13 50@14 50
Lake Superior " "	14 75@15 25

BUFFALO:

No. 1 Foundry Strong Coke Iron Lake Superior Ore	$... ...$12 00
No. 2 Foundry Strong Coke Iron Lake Superior Ore	... ... 11 50
Ohio Strong Softener No. 1	... ... 12 25
Jackson Co. Silvery No. 1	... ... 14 25
Lake Superior Charcoal	... ... 14 00
Southern Soft No. 1	... ... 12 00
Hanging Rock Charcoal	... ... 17 00

ST. LOUIS (reported by Rogers, Brown & Meacham):

Southern Coke No 1	$... ...$11 00
Southern Coke No. 2	... ... 10 50
Southern Coke No. 3	... ... 10 00
Southern Gray Forge	... ... 9 75
Southern Charcoal No. 1	... ... 15 00
Missouri Charcoal No. 1	14 00@14 00
Ohio Softeners	... ... 15 50
Lake Superior Car Wheel	... ... 15 20
Southern Car Wheel	... ... 15 25

OLD RAILS AND SCRAP METAL.

[Delivered Cleveland.] GROSS TONS

Old iron rails	$14 50
Old steel rails	10 50
Old car wheels	10 00

NET TONS

No. 1 R. R. wrought scrap	$10 50
Mill scrap	8 00
No. 1 Machine cast scrap	8 50
Iron axles	14 50
Axle turnings	7 50
Wrought turnings (free from cast)	6 75
Cast borings	5 00
Uncut wrought iron boilers	4 00
Steel boiler plates	8 00
Grate bars	5 00
Pipes and flues (clean)	8 00
Tank iron	8 00
Hoop and band iron	6 00
Sheet iron	5 00
Wrought drillings	6 00
Malleable iron	9 00

STRUCTURAL MATERIAL.

Beams and Channels (f. o. b. Cleveland)	1.65¢
Angles	1.25¢
Tees	1.35¢
Universal Plates	1.25@1.30¢
Sheared Plates	1.30¢

MERCHANT IRON AND STEEL.

[Less than car-lots, Cleveland.]

Rounds and Squares.—Bar Iron.

1 to 1⅞	1.20 Base.
2 to 2½	.20 extra.
3 to 3½	.50 "
3⅝ to 4	.80 "
4⅛ to 4½	1.00 "
4⅝ to 5	1.30 "
5⅛ to 6	1.80 "
6⅛ to 6½	2.20 "

PERFORATED METALS

OF ALL KINDS FOR

MILLING, MINING AND AGRICULTURAL MACHINERY.

Perforated Iron, Steel, Copper, Brass, Tin, Zinc, Lead, Etc., to Order.
Large and Varied Assortment of Sizes. Correspondence Solicited.

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THE 1896 EDITION

OF THE

Iron and Steel Directory

Will be sent postpaid by *The Iron Trade Review* at **$6.**

Is a thorough revision of the list of blast furnaces, rolling mills, Bessemer and Open-Hearth steel works, plate and sheet mills, nail mills, tin plate mills, malleable, cast iron pipe and wrought pipe works, car wheel and locomotive works.

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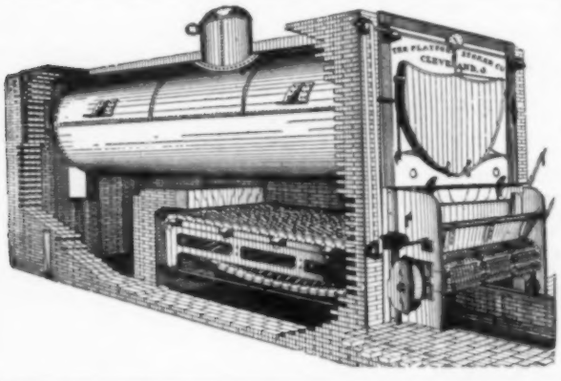
Is one of the requisites of satisfactory results. In the expansion of business which is confidently expected in the United States in the very near future, advertisers who have made themselves regularly prominent in the past two years will be first to reap the rewards of persistent publicity.



The Playford Mechanical Stoker

Guaranteed to

Abolish smoke, to increase boiler capacity and to save fuel.

For information, address,

The Playford Stoker Co.,

No. 61 Case Library Bldg.,

CLEVELAND, O.

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.

CLEVELAND OHIO.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

6⅝ to 7¼	2.50 extra.
¾ to ⅞	10 "
⅝ to 11-16	.20 "
½ to 9-16	.30 "
7-16 to 15-32	.40 "
⅜ to 13-32	.50 "
5-16 to 11-32	.70 "
¼ to 9-32	.90 "
7-32	1.40 "
3-16	2.50 "

Flats—Bar Iron.

1½ to 4 x ⅜ to 1	1.20 Base.
4¼ to 6 x ⅜ to 1	.10 extra.
6¼ to 8 x ⅜ to 1	.62 "
8¼ to 10 x ⅜ to 1	.80 "
1⅜ to 4 x 1 1-16 to 1½	.30 "
4¼ to 6 x 1 1-16 to 1½	.40 "
6¼ to 8 x 1 1-16 to 1½	.60 "
8¼ to 10 x 1 1-16 to 1½	.90 "
2 to 4 x 1⅝ to 2	.50 "
4¼ to 6 x 1⅝ to 2	.60 "
6¼ to 8 x 1⅝ to 2	.80 "
8¼ to 10 x 1⅝ to 2	1.00 "
2 to 4 x 2⅛ to 3	.60 "
4¼ to 6 x 2⅛ to 3	.80 "
6¼ to 8 x 2⅛ to 3	1.00 "
1⅛ to 1⅜ x ⅜ to 1	.10 "
1 to 1 1-16 x ⅜ to ⅞	.20 "
¾ to 15-16 x ⅜ to ¼	.40 "
⅝ to 11-16 x ⅜ to ⅝	.50 "
½ to 9-16 x ⅜ to ½	.90 "

Heavy Band Iron.

7 to 10 x ¼ to 5-16	.70 extra.
6¼ to 6¾ x ¼ to 5-16	.50 "
4¼ to 6 x ¼ to 5-16	.30 "
1½ to 4 x ¼ to 5-16	.20 "
1 to 1⅜ x ¼ to 5-16	.30 "
¾ to 15-16 x ¼ to 5-16	.50 "
⅝ to 11-16 x ¼ to 5-16	.80 "
½ to 9-16 x ¼ to 5-16	1.00 "
⅜ to 7-16 x ¼ to 5-16	1.50 "

Heavy bands, 7-32 in. thick 1-10 c. per lb. higher than ¼ to 5-16 thick. **Bevel Edge Shaft Iron** 1-10 higher than same size of Heavy Bands.

Light Band Iron.

7 to 8 x No. 9 to 3-16	.90 extra.
7 to 8 x Nos. 10, 11 and 12	1.00 "
6¼ to 6¾ x No. 9 to 3-16	.70 "
6¼ to 6¾ x Nos. 10, 11 and 12	.80 "
4¼ to 6 x No. 9 to 3-16	.50 "
4¼ to 6 x Nos. 10, 11 and 12	.60 "
1¼ to 4 x No. 9 to 3-16	.40 "
1¼ to 4 x Nos. 10, 11 and 12	.50 "
1 to 1 3-16 x No. 9 to 3-16	.50 "
1 to 1 3-16 x Nos. 10, 11 and 12	.60 "
13-16 to ⅞ x No. 9 to 3-16	.60 "
13-16 to ⅞ x Nos. 10, 11 and 12	.70 "
11-16 to ¾ x No. 9 to 3-16	.80 "
11-16 to ¾ x Nos. 10, 11 and 12	.90 "
9-16 to ⅝ x No. 9 to 3-16	1.00 "
9-16 to ⅝ x Nos. 10, 11 and 12	1.10 "
7-16 to ½ x No. 9 to 3-16	1.30 "
7-16 to ½ x Nos. 10, 11 and 12	1.40 "
⅜ x No. 9 to 3-16	1.50 "
⅜ x Nos. 10, 11 and 12	1.60 "

Bevel Edge Box Iron.

Same as Light Bands, of same sizes.

Beaded Band Iron, 1¼ in. to 2 in. .70

Sand Band Iron, 1-10 c. above same sizes of Light Bands.

Oval Iron.

⅜ to 1⅛	.40 extra.
¾ to 13-16	.50 "
⅝ to 11-16	.60 "
½ to 9-16	.80 "
⅜ to 7-16	1.10 "
½ to 9-16 x 3-16	1.00 "
⅝ to 11-16 x ⅛	1.20 "

Half Oval and Half Round.

2¼ to 3	.60 extra.
⅞ to 2	.50 "
¾ to 13-16	.70 "
⅝ to 11-16	.90 "
½ to 9-16	1.20 "
⅜ to 7-16	2.50 "
5-16	3.50 "
¼	4.50 "

Half Ovals less than ¼ their width in thickness, extra price.

Horse Shoe Iron

All sizes 1 c extra.

Cutting ordinary bars to specified length, .20 to .30 extra, according to length and size.

Steel Bands.

Width In Inches.	English Standard Gauge.		Extras.
1 1-2 to 6,	Nos. 7, 8, 9 or 3-16 "	1.50	Base.
1½ to 6,	" 10, 11, 12 or 1/4"	.05	per 100 lbs.
1 to 1¾,	" 7, 8, 9 or 3-16"	.10	"
1 to 1¾,	" 10, 11, 12 or 1/4"	.15	"
13-16 and ⅞,	" 7, 8, 9 or 3-16"	.20	"
13-16 and ⅞,	" 10, 11, 12 or 1/4"	.25	"
11-16 and ¾,	" 7, 8, 9 or 3-16"	.30	"
11-16 and ¾,	" 10 11, 12 or 1/4"	.35	"
9-16 and ⅝,	" 7, 8, 9 or 3-16"	.40	"
9-16 and ⅝,	" 10 11, 12 or 1/4"	.45	"
½,	Nos. 7, 8 9 or 3-16"	.55	"
½,	" 10, 11, 12 or 1/4"	.60	"
7-16	" 7, 8, 9 or 3-16"	.75	"
7-19	" 10, 11, 12 or 1/4"	.85	"
⅜,	" 7, 8, 9 or 3-16"	.95	"
⅜,	" 10, 11, 12 or 1/4"	1.05	"

Iron and Steel Hoops.

Width in Inches.	English Standard Gauge.		Extras
1 7-16 to 3	Nos. 13, 14, 15 and 16	1.60	Base
1 7-16 to 2,	" 17, 18, and 19	.05	per 100 lbs.
1 7-16 to 2,	" 20	.10	"
1 7-16 to 2,	" 21	.15	"
1 7-16 to 1¾,	" 22	.25	"
1 ⅝ to 1¾,	" 13, 14 and 15	.05	"
1⅝ to 1¾	" 16,117 and 18	.10	"

R. D. NUTTALL CO.,

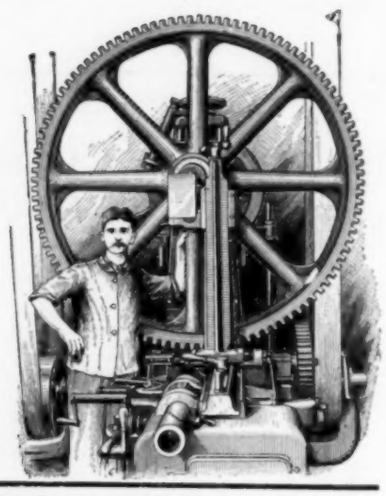
99 BOQUET STREET, ALLEGHENY, PA.

. . . . OUR . . . .

HEAVY DUTY GEARS

FOR

Bridge and Mining Work



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Correspondence Solicited.

THE BRASS FOUNDERS' SUPPLY CO.

FURNACES, FLASKS, FOUNDRY Supplies and Specialties.

Send for our Catalogue and look at the Ribbed Flask.

R. M. BARNETT. 20-34 Prospect St., **NEWARK, N. J.** J. S. MUNDY.

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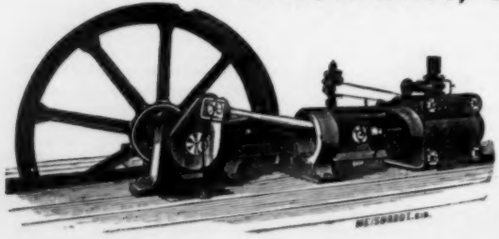
We are the only Steel Roofing Co. awarded Medal and Diploma for **PATENT CAP ROOFING** at World's Columbian Exposition. We are also large manufacturers of all styles of METAL ROOFING, SIDING, CEILING, ETC. Send for Catalogue and Price List. Mention this paper.

SYKES IRON & STEEL ROOFING CO., - Chicago and Niles, O.

THE LANE & BODLEY CO.,

CINCINNATI, OHIO.



Engines,

ALL SIZES.

Simple and Compound.

Shafting, Hangers, Pulleys.

Belt Elevators, Saw Mills.

1⅛ to 1⅜,	"	19 and 20	.15 per 100 lb
1⅛ to 1⅜,	"	21	.20 "
1⅛ to 1⅜,	"	22	.30 "
15-16 and 1,	"	13, 14 and 15	.10 "
15-16 and 1	"	16, 17 and 18	.15 "
15 16 and 1,	"	19 and 20	.20 "
15-16 and 1,	"	21	.25 "
15 16 and 1,	"	22	.35 "
⅞,	Nos.	13, 14 and 15	.20 "
⅞,	"	16, 17 and 18	.25 "
⅞,	"	19 and 20	.30 "
⅞,	"	21	.35 "
⅞,	"	22	.45 "
¾ and 13-16	Nos.	13, 14 and 15	.30 "
¾ and 13-16	"	16, 17 and 18	.35 "
¾ and 13-16	"	19 and 20	.40 "
¾ and 13-16	"	21	.45 "
¾ and 13-16	"	22	.50 "
¾ and 13-16	"	23	.60 "
11-16,	Nos.	13, 14 and 15	.35 "
11 16,	"	16, 17 and 18	.40 "
11-16,	"	19 and 20	.50 "
11-16,	"	21	.60 "
11-16,	"	22	.70 "
11-16.	"	23	.80 "
⅝,	Nos.	13, 14 and 15	.40 "
⅝,	"	16, 17 and 18	.45 "
⅝,	"	19 and 20	.55 "
⅝,	"	21	.65 "
⅝,	"	22	.75 "
⅝	"	23	.85 "
9 16,	"	13, 14 and 15	.45 "
9-16,	"	16, 17 and 18	.50 "
9-16,	"	19 and 20	.60 "
9-16,	"	21	70 "
9-16,	"	22	.80 "
9-16,	"	23	.90 "
½,	"	13, 14 and 15	55 "
½,	"	16, 17 and 18	.60 "
½,	"	19 and 20	.70 "
½,	"	21	.80 "
½,	"	22	.90 "
½,	"	23	1.00 "
7-16,	"	13, 14 and 15	.80 "
7-16,	"	16, 17 and 18	.90 "
7-16,	"	19 and 20	1.00 "
7/16,	"	13, 14 and 15	1.00 "
7/16,	"	16, 17 and 18	1.10 "
7/16,	"	19 and 20	1.20 "

Sheet Iron.

No. 10	1 50
No. 12	1 70
No. 14	1 60
No. 15-17	1 75
No. 18	1 85
No. 20	2 00
No. 22-24	2 0
No. 25-26	2 20
No. 27	2 30

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

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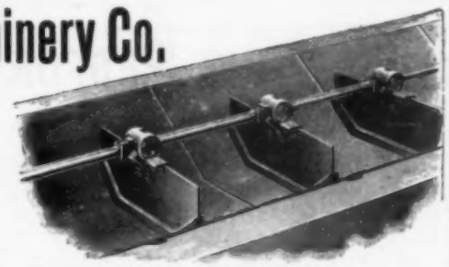

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Flange	1 55
Marine Flange	1 60
Fire Box	2 05

Above includes plates 90 inches wide.

90 to 96 in. wide	⅛c. ₩ extra
96 to 100 in. wide	1c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special.

Flats. cts. ₩.

2 to 9-16 in. wide by 2 to ⅝ thick .08

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Bessemer Machinery	base price,	1 40
Open-hearth Tire	"	1 45
Open-hearth Spring	"	1 80
Sleigh Shoe	"	1 45
Toe Calk	"	1 90
Cutter Shoes, tapered and bent	"	1 60

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7-16 to ⅜ and 2¾ to 3 in.	09
3½ to 4 in	09½
⅝ to 11-16 and 4½	10
½ to 6 in	10½
¼ to 9-32 and 6½ to 7 in	11
1 in.	13

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Bridge ½, ⅝, 11-16 and ¾ inch diam	2 55

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Lap weld black, base, four ins.	62
Butt " " " four ins.	62½
Lap " galv. " four ins.	52½
Butt " " " four ins.	50
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Boiler tubes 2½" and larger	75
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Casing inserted joint	dis. 47½

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Wright's	₩ lb 12

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Hand	dis 40&10@50

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" " " extra	dis 60&10
" " " best	dis 55
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Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 4[illegible]
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B. F. Sturtevant's	dis 20
Boston Blower Co.	dis 35

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 80
" 3 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis 33⅓
Horton's Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 45
Sweetland "	dis 40
Almond Drill	dis 40
Morse "	dis 20
Skinner's Combination Lathe	dis 40&15
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 30

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Pratt & Whitney	dis 10@15
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Iron, steel points	₩ lb 3

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Morse Taper&Straight Shank to 1¾"	dis 50 &10 to 60
Morse Taper and Straight Shank Larger than 1¾"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 60@60&5
Cleveland " "	dis 60@60&5

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	No. 4 to 46 gr.	No. 54 to 150 gr.	Flour, F. F
Kegs, ₩ lb	4½c	5 c	2½c
½ kegs ₩ lb	4¾c	5¼c	2¾c
¼ kegs ₩ lb	5 c	5½c	3 c
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Vitrified.....dis 60@70
Vulcanite.....dis 60&10
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Disston's.....dis 65@70
Western.....dis 70
Stub's.....dis 25
Grobet's.....dis 30
Reynolds Bros.' Hand Cut.....dis 50
Industry File Works Hand Cut.....dis 50

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P. S. W.....dis 40
Atha new list, Jan. 15, 1887.....dis 50
Heavy hammers and sledges under 5 lbs.....10c
" " " " over 5 lbs.....8c

Jack Screws.

Illinois Bolt Co. list.....dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4½	4	3½	3½
Hexagon	15½	11½	8½	6	5½	5¼	
Washers	9	8	7	5	4½	4½	4¼

In lots less than 100 lbs, ₩ lb add ½c., 1 lb boxes add 1c to list.

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Less than car lots.....$1.60

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" 6 to 7 lbs.....$13 dis 6c

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Iron, Thousand, list November 1, 1894.....dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894.....dis 60@65
Copper.....dis 50@50&10

Taps.

Cards, Hand and Nut to 2 in.....dis 50
Carpenters' " " " .....dis 50
Morse " " " .....dis 50
Pratt & Whitney " " " new list.....dis 10
Machine Screw Taps.....dis 55
Pipe Taps to 2½ in.....dis 70
Stay Bolt Taps.....dis 25
Stove Bolt Taps.....dis 55
Pulley Taps.....dis 40

Vises.

Solid Box.....dis 60
Parker's.....dis 20@25
Prentiss.....dis 20
Stephen's.....dis 25@30
Barrett's.....dis 30
Miller's Falls.....dis 40
Merrill's.....dis 15@20
Howard.....dis 30

Wire.

New List, Apr. 9, 1894

Brass.....dis 35
Copper.....dis 35c
Bright and annealed, Nos. 0@18.....dis 70&10@75
" " Nos. 19@26.....dis 75@75&5
" " Nos. 27@36.....dis 75&10&5
Coppered Nos. 0 to 18, market list.....dis 70@70&5
Galvanized Nos. 0 to 18 " " .....dis65&
Tinned market Nos. 0 to 18.....dis 67½
Cast steel.....dis 50
Tinned Broom Wire.....dis 70&5@70&10
Annealed Fence, Nos. 8 and 9.....dis 75
Annealed Grape, Nos. 10 to 14.....dis 75
Stub's Steel Wire regular.....95c ₩ lb dis 30

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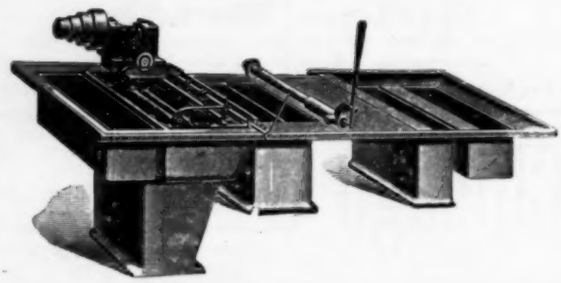

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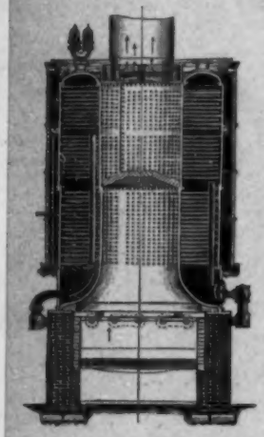

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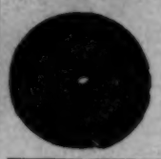

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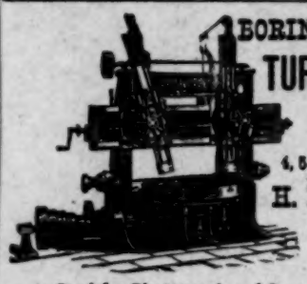

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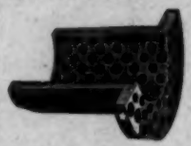

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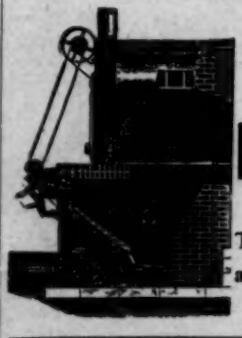

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